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# RESEARCH MEMORANDUM

TESTS IN THE AMES 40- BY 80-FOOT WIND TUNNEL OF THE  
AERODYNAMIC CHARACTERISTICS OF AIRPLANE  
MODELS WITH PLAIN SPOILER AILERONS

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NATIONAL ADVISORY COMMITTEE  
FOR AERONAUTICS

WASHINGTON

December 6, 1954

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## NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

RESEARCH MEMORANDUM

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AERODYNAMIC CHARACTERISTICS OF AIRPLANE  
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## SUMMARY

Four wings of different plan form equipped with plain spoiler ailerons have been tested at low speeds. Three of the models had wings of aspect ratio 3, the taper ratios and sweep of the quarter-chord lines being 0.40 and  $16^{\circ}$ ; 0.40 and  $41^{\circ}$ ; and 0 and  $45^{\circ}$ . The fourth model had a wing of aspect ratio 4.8 with a taper ratio of 0.51 and sweep of  $35^{\circ}$ . The spoilers were mounted normal to the wing upper surface along a constant-percent-chord line and were of constant-percent-chord height. Spoiler heights of 5-, 10-, and 15-percent chord, and spoiler lengths of 5- to 100-percent semispan were tested. The tests were conducted at Reynolds numbers from 7 to 13 million at a Mach number of 0.13. The data obtained are presented without discussion in the form of tabulated, six-component force and moment characteristics. In addition, some of the data are presented in graphic form.

## INTRODUCTION

Retractable spoiler ailerons have been among the devices suggested to assist or replace flap-type ailerons as lateral controls on high-speed aircraft. Because of this interest, research work on spoilers has been carried out in wind-tunnel and flight tests. A bibliography of reports resulting from this research is given in reference 1.

It is the purpose of this report to present data showing the effect of plain spoiler ailerons on the characteristics of wing plan forms not previously tested with spoilers. Four wings of different plan form equipped with spoilers of various heights and spanwise extents were tested. The data presented in this report were obtained for use in developing and evaluating a method of predicting the rolling effectiveness of spoilers which is presented in reference 2. All of the data are

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in tabulated form and, in addition, some data showing significant trends are also presented in graphic form.

#### NOTATION

The coefficients and symbols used in this report are defined as follows:

b wing span, measured perpendicular to plane of symmetry, ft

$C_D$  drag coefficient,  $\frac{\text{drag}}{qS}$

$C_l$  rolling-moment coefficient,  $\frac{\text{rolling moment}}{qSb}$

$C_L$  lift coefficient,  $\frac{\text{lift}}{qS}$

$C_m$  pitching-moment coefficient,  $\frac{\text{pitching moment}}{qS\bar{c}}$

$C_n$  yawing-moment coefficient,  $\frac{\text{yawing moment}}{qSb}$

$C_y$  side-force coefficient,  $\frac{\text{side force}}{qS}$

c wing chord, measured parallel to plane of symmetry, ft

$\bar{c}$  mean aerodynamic chord of wing, measured parallel to plane of

$$\text{symmetry, } \frac{\int_0^{b/2} c^2 dy}{\int_0^{b/2} c dy}, \text{ ft}$$

h height of spoiler above wing surface, measured normal to wing surface, ft

q free-stream dynamic pressure, lb/sq ft

S wing area, sq ft

- $x_s$  distance from wing leading edge to spoiler, measured parallel to plane of symmetry, ft
- $y$  lateral coordinate perpendicular to plane of symmetry, ft
- $y_s$  distance from model center line to edge of spoiler, measured perpendicular to plane of symmetry, ft
- $\alpha$  angle of attack of the wing-chord plane with reference to free stream, deg
- $\eta_i$  spanwise location of inboard end of spoiler,  $\frac{y_{s\text{inboard}}}{b/2}$
- $\eta_o$  spanwise location of outboard end of spoiler,  $\frac{y_{s\text{outboard}}}{b/2}$

#### DESCRIPTION OF MODELS TESTED

The geometric characteristics of the models tested are shown in figures 1 to 4. These figures and table I identify each of the four models by a number which will henceforth be used when referring to that model.

Tables II through V give the airfoil section ordinates for the models. It should be noted that model 2 was tested with each of two airfoil sections, one section being a modification of the basic NACA 64A006 airfoil section. The modification was made in connection with another investigation.

The spoilers used were fabricated of 3/8-inch plywood, and were installed perpendicular to the wing upper surface along the 70-percent-chord line. In addition, for model 2, spoilers were also placed along either the 60- or the 80-percent-chord lines. All of the spoilers were of constant-percent-chord height and were unperforated. Heights of 5-, 10-, and 15-percent chord were tested. A photograph of a typical installation is shown in figure 5. Spoilers were tested on the upper surface of the right wing panel of each model and varied in length from 5- to 100-percent semispan.

## TESTS AND RESULTS

The tests made on the various models and configurations are listed in table VI. Included are tests made with the vertical tail removed from model 2, and tests made with the horizontal tail removed from model 4. These surfaces were removed in order to determine the effect of their presence on the rolling moment. It should be noted that model 2 complete with vertical tail was tested only with the modified leading edge. All of the tests were made at a dynamic pressure of 25 pounds per square foot and at a Mach number of 0.13. The Reynolds number of the various tests is given in table VI. All of the tests were made at zero sideslip with the range of angles of attack for the different models as follows:

Model 1	$\alpha$ , $-2^\circ$ to $18^\circ$
Model 2	$\alpha$ , $-2^\circ$ to $20^\circ$
Model 3	$\alpha$ , $-2^\circ$ to $20^\circ$
Model 4	$\alpha$ , $-2^\circ$ to $16^\circ$

The data have been reduced to NACA coefficient form with the moment center taken at 25 percent of the mean aerodynamic chord. The angle of attack, drag, and pitching moment (for the model with a horizontal tail) have been corrected for wind-tunnel-wall effects. The drag and pitching moment have been corrected for support-strut interference. The angle of attack and drag have also been corrected for air-stream inclination. Corrections due to asymmetrical wing loading were considered negligible. None of the data have been corrected for tare loads due to basic model asymmetry, but the incremental change in any characteristic due to spoiler deflection can be obtained by referring to the data tabulated for the model without spoilers.

The data indexed in table VI are tabulated in tables VII to XIII. Six-component force and moment data are presented for all models. In addition to the tabulated data, figures 6 to 9 present plots of the data obtained on the four models both without spoilers and with full-semispan spoilers deflected. These curves are considered typical of the data tabulated since, in general, the aerodynamic characteristics of the partial-semispan spoilers have the same trends as the curves presented.

Ames Aeronautical Laboratory  
National Advisory Committee for Aeronautics  
Moffett Field, Calif., Aug. 26, 1954

## REFERENCES

1. Lowry, John G.: Data on Spoiler-Type Ailerons. NACA RM L53I24a, 1953.
2. Franks, Ralph W.: The Application of a Simplified Lifting-Surface Theory to the Prediction of the Rolling Effectiveness of Plain Spoiler Ailerons at Subsonic Speeds. NACA RM A54H26a, 1954.

TABLE I.- DIMENSIONAL DATA OF MODELS 1, 2, 3, AND 4

	Model			
	1	2	3	4
Wing				
Area, sq ft. . . . .	312.5	312.5	313.76	287.58
Span, ft . . . . .	30.62	30.62	30.64	37.12
Mean aerodynamic chord, ft .	10.83	10.83	13.65	8.09
Aspect ratio . . . . .	3.00	3.00	2.99	4.78
Sweep, quarter-chord line, deg. . . . .	15.94	40.6	45.0	35.0
Taper ratio. . . . .	0.40	0.40	0	0.51
Twist, deg . . . . .	0	0	0	2
Dihedral, deg. . . . .	0	0	0	3
Fuselage				
Length, ft . . . . .	---	56.16	56.16	46.00
Maximum diameter, ft . . . .	---	4.49	4.49	3.68
Fineness ratio . . . . .	---	12.50	12.50	11.55
Vertical tail				
Exposed area, sq ft. . . . .	---	52.53	52.53	15.5
Aspect ratio of plan form extended to model center line . . . . .	---	1.00	1.00	0.93
Taper ratio. . . . .	---	0	0	0.60
Airfoil section thickness, percent chord. . . . .	---	5	5	16
Horizontal tail				
Area, sq ft. . . . .	---	---	---	34.74
Aspect ratio . . . . .	---	---	---	4.68
Taper ratio. . . . .	---	---	---	0.45
Sweep, quarter chord, deg. .	---	---	---	35.00
Dihedral angle, deg. . . . .	---	---	---	10.00

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TABLE II.- COORDINATES OF THE AIRFOIL SECTION  
USED FOR MODEL 1 (MODIFIED DIAMOND)

[All coordinates are in percent chord  
and are taken parallel to the model  
center line.]

Station	Ordinate
0	<sup>a</sup> 0
43.34	<sup>a</sup> 1.950
45.00	2.015
47.50	2.079
50.00	2.100
52.50	2.079
55.00	2.015
56.66	<sup>b</sup> 1.950
100.00	<sup>b</sup> 0

<sup>a</sup>Airfoil has straight line between these points.

<sup>b</sup>Airfoil has straight line between these points.





TABLE III.- COORDINATES OF THE AIRFOIL SECTIONS  
USED FOR MODEL 2

[All coordinates are referred to the chord of the  
NACA 64A006 section and are in terms of percent of  
that chord. The sections are taken normal to the  
streamwise 0.31-chord line.]

Station	Ordinates of original sections (NACA 64A006)	Ordinates of modified sections	
		Upper surface	Lower surface
-1.50		-1.380	-1.380
-1.25		-.600	-2.065
-1.00		-.340	-2.315
-.75		-.145	-2.490
-.25		.160	-2.750
.00		.290	-2.855
.25	0	.395	-2.955
.50	.485	.490	-3.040
.75	.585	(1)	-3.100
1.25	.739		-3.220
2.5	1.016		-3.405
5.0	1.399		-3.600
7.5	1.684		-3.670
10	1.919		-3.680
15	2.283		-3.610
20	2.557		-3.450
25	2.757		-3.235
30	2.896		-3.095
35	2.977		-3.020
40	2.999		-3.000
45	2.945		(1)
50	2.825		
55	2.653		
60	2.438		
65	2.188		
70	1.907		
75	1.602		
80	1.285		
85	.967		
90	.649		
95	.331		
100	.013		
L. E. radius: 0.246		1.19	
		Center of L.E. circle:	sta -0.31 ord -1.33

<sup>1</sup>Ordinates identical to those of the NACA 64A006 section.

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TABLE IV.- COORDINATES OF THE AIRFOIL SECTION USED  
FOR MODEL 3 (NACA 0005-MODIFIED)

[All coordinates are in percent  
chord and are taken parallel to  
the model center line.]

Station	Ordinate
0	0
1.25	.789
2.50	1.089
5.00	1.481
7.50	1.750
10.00	1.951
15.00	2.228
20.00	2.391
25.00	2.476
30.00	2.501
40.00	2.419
50.00	2.206
60.00	1.902
67.00	1.650
70.00	1.500
80.00	1.000
90.00	0.500
100.00	0
L. E. radius: 0.275	

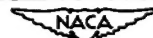


TABLE V.- COORDINATES OF THE AIRFOIL SECTIONS USED FOR MODEL 4  
(NACA 0012-64 MODIFIED AT ROOT; NACA 0011-64 MODIFIED AT TIP)

[All coordinates are in percent chord and  
are taken normal to the 0.25 chord  
stations.]

Station	Root station ( $2y/b = 0$ ) ordinates		Tip station ( $2y/b = 0.990$ ) ordinates	
	Upper	Lower	Upper	Lower
0	0.573	0.573	-0.378	-0.378
.5	1.659	-.601	.661	-.134
.75	1.900	-.846	.875	-1.559
1.25	2.250	-1.224	1.196	-1.880
2.5	2.855	-1.867	1.768	-2.405
5.0	3.588	-2.706	2.491	-3.062
7.5	4.062	-3.294	3.000	-3.500
10.0	4.415	-3.756	3.396	-3.825
15.0	4.902	-4.466	3.989	-4.273
20.0	5.208	-4.984	4.441	-4.577
25.0	5.401	-5.417	4.780	-4.771
30.0	5.496	-5.732	5.041	-4.878
35.0	5.506	-5.971	5.221	-4.911
40.0	5.438	-6.129	5.339	-4.875
45.0	5.282	-6.198	5.371	-4.766
50.0	5.046	-6.185	5.337	-4.589
55.0	4.719	-6.092	5.223	-4.336
60.0	4.326	-5.919	5.043	-4.003
65.0	3.850	-5.665	4.796	-3.607
70.0	3.293	-5.335	4.478	-3.145
75.0	2.660	-4.933	4.100	-2.614
<sup>a</sup> 80.0	1.952	-4.456	3.654	-2.011
<sup>a</sup> 100.0	-1.719	-1.719	1.125	1.125
L. E. radius: 1.527			1.236	

<sup>a</sup>Airfoil has straight lines between these points.



TABLE VI.- SUMMARY OF CONFIGURATIONS TESTED

Model	Configuration (1)	$x_s/c$	$h/c$	$\eta_1$	$\eta_0$	Reynolds number	Figure	Table
1	W	---	0	---	---	$9.7 \times 10^8$	6	VII
↓	↓	0.70	.05	0	0.2	↓	---	↓
				0	.4		---	
				0	.6		---	
				0	.8		---	
				0	1.0		6	
				.4	1.0		---	
				.6	1.0		---	
			↓					
			.10	0	.2		---	
				0	.4		---	
				0	.6		---	
				0	.8		---	
				0	1.0		6	
				.2	1.0		---	
				.4	1.0		---	
				.6	1.0		---	
				.8	1.0		---	
				.4	.8		---	
			↓					
			.15	0	1.0		6	
2	W+F	---	0	---	---	$9.7 \times 10^8$	7	VIII
↓	↓	.70	.05	.15	.2	↓	---	↓
				.15	.4		---	
				.15	.6		---	
				.15	.8		---	
				.15	1.0		7	
				.20	1.0		---	
				.4	1.0		---	
				.6	1.0		---	
				.8	1.0		---	
			↓					
			.10	.15	.2		---	
				.15	.4		---	
				.15	.6		---	
				.15	.8		---	
				.15	1.0		7	
				.2	1.0		---	
				.4	1.0		---	
				.6	1.0		---	
				.8	1.0		---	
				.2	.6		---	
				.4	.6		---	

1 Configuration designations: W, wing; F, fuselage; V, vertical tail; H, horizontal tail; W<sub>mod</sub>, modified wing.



TABLE VI.- SUMMARY OF CONFIGURATIONS TESTED - Continued

Model	Configuration ( <i>z</i> )	<i>x<sub>s</sub>/c</i>	<i>h/c</i>	$\eta_1$	$\eta_0$	Reynolds number	Figure	Table								
2	W+F	0.70	0.15	0.15	0.2	$9.7 \times 10^6$	---	VIII								
	↓	↓	↓	↓	↓		---	↓								
							.15	.4	---							
							.15	.6	---							
							.15	.8	---							
							.15	1.0	7							
							.2	1.0	---							
							.4	1.0	---							
							.6	1.0	---							
							.8	1.0	---							
							.2	.6	---							
							W <sub>mod</sub> +F+V	---	0	---	---	---	IX			
	↓	↓	↓	↓	↓		---	IX								
							.70	.10	---	X(a)						
							---	0	---							
							.70	.05	---							
							↓	↓	↓	↓	↓	---				
												.15	.4	---		
												.15	1.0	---		
												.6	1.0	---		
												.15	.4	---		
												.15	1.0	---		
												.6	1.0	---		
	.15	.4	---													
	.15	.6	---													
	.15	.8	---													
	W <sub>mod</sub> +F	---	0	---	---							---				
	↓	↓	↓	↓	↓		↓	---								
								.70	.05	---						
								↓	↓	↓	↓	↓	---			
													.15	.4	---	
													.15	1.0	---	
.6						1.0							---			
.15						.4							---			
.15						1.0							---			
.6						1.0							---			
.15						.4							---			
.15						.6							---			
.15	1.0	---														
.4	1.0	---														
.6	1.0	---														
.8	1.0	---														
3	W+F+V	---	0	---	---	$12.8 \times 10^6$	8	XI								
	↓	↓	↓	↓	↓		---	↓								
							.70	.05	---							
							.15	.2	---							
							.15	.4	---							
							.15	.6	---							
							.15	.8	---							
							.15	1.0	8							
							.2	1.0	---							
							.4	1.0	---							
							.6	1.0	---							
							.8	1.0	---							
							.2	.4	---							
							.4	.6	---							
							.4	.8	---							
							---	---	---							
---	---	---														

<sup>2</sup>See footnote 1, p. 11.

TABLE VI.- SUMMARY OF CONFIGURATIONS TESTED - Concluded

Model	Configuration (s)	$x_s/c$	$h/c$	$\eta_i$	$\eta_o$	Reynolds number	Figure	Table
3	W+F+V	0.70	0.10	0.15	0.2	$12.8 \times 10^6$	---	XI
↓	↓	↓	↓	.15	.4	↓	---	↓
↓	↓	↓	↓	.15	.6	↓	---	↓
↓	↓	↓	↓	.15	.8	↓	---	↓
↓	↓	↓	↓	.15	1.0	↓	8	↓
↓	↓	↓	↓	.2	1.0	↓	---	↓
↓	↓	↓	↓	.4	1.0	↓	---	↓
↓	↓	↓	↓	.6	1.0	↓	---	↓
↓	↓	↓	↓	.8	1.0	↓	---	↓
↓	↓	↓	↓	.2	.4	↓	---	↓
↓	↓	↓	↓	.4	.6	↓	---	↓
↓	↓	↓	↓	.4	.8	↓	---	↓
↓	↓	↓	.15	.15	.2	↓	---	↓
↓	↓	↓	↓	.15	.4	↓	---	↓
↓	↓	↓	↓	.15	.6	↓	---	↓
↓	↓	↓	↓	.15	.8	↓	---	↓
↓	↓	↓	↓	.15	1.0	↓	8	↓
↓	↓	↓	↓	.2	1.0	↓	---	↓
↓	↓	↓	↓	.4	1.0	↓	---	↓
↓	↓	↓	↓	.6	1.0	↓	---	↓
↓	↓	↓	↓	.8	1.0	↓	---	↓
↓	↓	↓	↓	.2	.4	↓	---	↓
↓	↓	↓	↓	.4	.6	↓	---	↓
↓	↓	↓	↓	.4	.8	↓	---	↓
4	W+F+V+H	---	0	---	---	$7.17 \times 10^6$	9	XII
↓	↓	.70	.10	.1	.2	↓	---	↓
↓	↓	↓	↓	.1	.4	↓	---	↓
↓	↓	↓	↓	.1	.6	↓	---	↓
↓	↓	↓	↓	.1	.8	↓	---	↓
↓	↓	↓	↓	.1	1.0	↓	---	↓
↓	↓	↓	↓	.2	1.0	↓	---	↓
↓	↓	↓	↓	.4	1.0	↓	---	↓
↓	↓	↓	↓	.6	1.0	↓	---	↓
↓	↓	↓	↓	.8	1.0	↓	---	↓
↓	↓	↓	↓	.4	.8	↓	---	↓
↓	W+F+V	---	0	---	---	↓	9	XIII
↓	↓	.70	.05	.1	.2	↓	---	↓
↓	↓	↓	↓	.1	.4	↓	---	↓
↓	↓	↓	↓	.1	.6	↓	---	↓
↓	↓	↓	↓	.1	.8	↓	---	↓
↓	↓	↓	↓	.1	1.0	↓	9	↓
↓	↓	↓	↓	.2	1.0	↓	---	↓
↓	↓	↓	↓	.4	1.0	↓	---	↓
↓	↓	↓	.10	.1	.4	↓	---	↓
↓	↓	↓	↓	.1	1.0	↓	9	↓
↓	↓	↓	↓	.4	1.0	↓	---	↓

<sup>3</sup>See footnote 1, p. 11.

TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1  
(a)  $x_g/c = 0.70$ ;  $h/c = 0$  and  $0.05$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.03	-0.106	0.0097	0.0073	-0.0001	0.0007	0.0003
.05	.008	.0075	.0082	0	.0006	.0001
2.13	.128	.0116	.0158	-.0004	.0012	.0003
4.21	.246	.0234	.0164	-.0001	.0012	.0003
6.30	.372	.0441	.0172	-.0003	.0005	.0002
8.40	.511	.0773	.0049	.0004	.0002	.0003
10.49	.643	.1205	-.0117	.0008	-.0004	.0002
12.56	.748	.1706	-.0430	.0019	-.0018	.0001
14.61	.819	.2186	-.0642	.0031	-.0001	-.0003
16.59	.786	.2501	-.0997	.0023	-.0020	-.0003
18.50	.655	.2366	-.0982	.0026	.0017	-.0016

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$ $\eta_1 = 0$ $\eta_0 = 0.20$							$h/c = 0.05$ $\eta_1 = 0$ $\eta_0 = 0.40$						
-2.03	-0.095	0.0163	-0.0060	0.0012	-0.0004	-0.0002	-2.06	-0.140	0.0240	-0.0096	0.0014	0.0013	0.0005
.05	.013	.0145	-.0038	.0010	.0002	-.0002	.02	-.022	.0209	-.0042	.0013	.0016	.0005
2.12	.119	.0184	-.0017	.0005	.0008	-.0002	2.10	.082	.0236	-.0035	.0014	.0029	.0003
4.21	.238	.0303	.0044	.0003	.0012	0	4.18	.195	.0334	.0016	.0013	.0039	.0001
6.30	.366	.0510	.0035	-.0001	.0019	.0001	6.27	.331	.0536	.0031	.0010	.0026	.0002
8.39	.502	.0835	-.0078	-.0004	.0011	.0001	8.36	.462	.0839	-.0075	.0009	.0030	0
10.47	.624	.1251	-.0247	.0004	.0015	-.0002	10.46	.596	.1245	-.0174	.0016	.0031	0
12.55	.735	.1750	-.0462	.0008	.0012	-.0003	12.53	.702	.1720	-.0470	.0010	.0040	-.0005
14.59	.786	.2149	-.0716	.0009	.0038	-.0012	14.59	.789	.2188	-.0717	.0006	.0036	-.0004
16.59	.788	.2514	-.0940	.0020	-.0008	-.0004	16.60	.805	.2490	-.0846	.0014	-.0004	-.0005
18.52	.738	.2669	-.1137	.0013	-.0010	.0001	18.52	.696	.2473	-.0980	.0023	.0004	-.0016
$h/c = 0.05$ $\eta_1 = 0$ $\eta_0 = 0.60$							$h/c = 0.05$ $\eta_1 = 0$ $\eta_0 = 0.80$						
-2.08	-0.168	0.0306	-0.0057	0.0012	0.0055	0.0022	-2.10	-0.195	0.0362	-0.0043	0.0015	0.0102	0.0037
0	-.061	.0263	.0025	.0012	.0058	.0019	-.02	-.081	.0308	.0015	.0012	.0113	.0034
2.07	.046	.0275	.0018	.0009	.0070	.0015	2.06	.023	.0312	.0037	.0008	.0019	.0028
4.15	.157	.0359	.0051	.0010	.0078	.0010	4.13	.132	.0382	.0069	.0006	.0131	.0022
6.25	.304	.0550	.0046	.0009	.0051	.0010	6.23	.276	.0552	.0067	.0005	.0098	.0016
8.36	.459	.0867	-.0067	.0007	.0049	.0005	8.35	.445	.0852	-.0057	.0004	.0062	.0009
10.45	.582	.1238	-.0196	.0012	.0061	-.0003	10.44	.581	.1232	-.0198	.0004	.0060	-.0001
12.53	.708	.1722	-.0476	.0001	.0060	-.0005	12.53	.702	.1711	-.0471	.0010	.0045	-.0011
14.59	.783	.2111	-.0620	.0003	.0052	-.0009	14.59	.790	.2143	-.0649	.0006	.0045	-.0012
16.59	.780	.2458	-.0945	.0006	.0019	-.0004	16.59	.793	.2442	-.0896	.0004	.0047	-.0010
18.52	.685	.2460	-.1008	.0017	.0004	-.0014	18.53	.701	.2464	-.0933	.0008	.0013	-.0012
$h/c = 0.05$ $\eta_1 = 0$ $\eta_0 = 1.0$							$h/c = 0.05$ $\eta_1 = 0.40$ $\eta_0 = 1.0$						
-2.10	-0.202	0.0407	-0.0009	0.0025	0.0147	0.0052	-2.07	-0.154	0.0258	0.0020	0.0009	0.0073	0.0046
-.02	-.087	.0348	.0057	.0017	.0144	.0048	.01	-.044	.0213	.0070	.0007	.0097	.0042
2.05	.017	.0345	.0087	.0009	.0150	.0041	2.09	-.070	.0232	.0126	-.0003	.0109	.0038
4.12	.119	.0413	.0123	.0005	.0175	.0034	4.17	.189	.0322	.0155	-.0005	.0111	.0030
6.23	.269	.0574	.0083	-.0001	.0142	.0023	6.28	.351	.0510	.0100	-.0004	.0059	.0021
8.35	.446	.0867	-.0063	.0006	.0063	.0010	8.40	.511	.0821	.0006	-.0007	.0005	.0016
10.45	.594	.1262	-.0208	.0004	.0063	-.0002	10.48	.629	.1188	-.0123	.0009	.0008	.0002
12.54	.725	.1741	-.0592	.0012	.0049	-.0017	12.55	.735	.1684	-.0452	.0013	.0007	.0009
14.59	.787	.2129	-.0660	.0013	.0034	-.0021	14.61	.814	.2154	-.0678	.0016	-.0005	-.0011
16.59	.793	.2448	-.0850	.0018	-.0013	-.0017	16.60	.809	.2514	-.0909	.0017	-.0044	-.0006
18.52	.695	.2480	-.1003	.0032	-.0016	-.0022	18.49	.652	.2357	-.0974	.0010	-.0020	0

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TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1 - Continued  
 (b)  $x_B/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$ $\eta_1 = 0.60$ $\eta_0 = 1.00$							$h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.20$						
-2.05	-0.135	0.0188	0.0043	0.0010	0.0046	0.0032	-2.08	-0.154	0.0269	-0.0069	0.0005	0.0035	0.0002
.03	-.012	.0159	.0089	.0008	.0046	.0029	0	-.038	.0224	-.0028	.0010	.0038	-.0001
2.11	.095	.0183	.0123	-.0003	.0071	.0026	2.08	.091	.0248	.0061	.0005	.0032	.0003
4.19	.213	.0291	.0135	.0004	.0075	.0021	4.15	.182	.0346	.0048	.0003	.0053	.0001
6.29	.366	.0486	.0117	-.0006	.0011	.0017	6.24	.304	.0529	.0044	.0008	.0029	-.0002
8.39	.502	.0796	.0028	-.0006	.0009	.0011	8.34	.448	.0839	-.0013	.0011	.0039	-.0004
10.48	.633	.1205	-.0168	.0008	.0010	.0002	10.42	.573	.1223	-.0116	.0028	.0039	-.0011
12.56	.742	.1667	-.0377	.0019	.0012	-.0010	12.51	.691	.1739	-.0423	.0034	.0037	-.0010
14.60	.800	.2154	-.0716	.0012	.0048	-.0013	14.56	.765	.2166	-.0714	.0033	.0115	-.0029
16.60	.800	.2487	-.0927	.0018	-.0001	-.0009	16.59	.790	.2534	-.0927	.0033	.0014	-.0008
18.52	.688	.2503	-.1079	.0030	.0010	-.0016	18.55	.727	.2603	-.1068	.0023	.0040	-.0013
$h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.40$							$h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.60$						
-2.12	-0.205	0.0406	-0.0104	0.0017	0.0082	0.0018	-2.15	-0.245	0.0545	-0.0022	0.0010	0.0154	0.0047
-.04	-.097	.0349	-.0039	.0016	.0090	.0014	-.08	-.143	.0469	.0012	.0016	.0153	.0038
2.04	.030	.0363	.0032	.0010	.0090	.0015	2.00	-.023	.0469	.0078	.0008	.0167	.0036
4.11	.124	.0427	.0051	.0014	.0101	.0009	4.08	.072	.0500	.0127	.0013	.0174	.0027
6.20	.247	.0591	.0059	.0005	.0085	.0009	6.15	.179	.0620	.0067	.0007	.0154	.0019
8.30	.391	.0882	-.0033	.0012	.0081	.0005	8.27	.359	.0921	-.0025	.0017	.0144	.0013
10.39	.531	.1269	-.0118	.0006	.0066	.0007	10.37	.502	.1289	-.0130	.0010	.0091	.0015
12.48	.640	.1741	-.0390	.0031	.0086	.0008	12.47	.634	.1753	-.0470	.0042	.0096	-.0011
14.56	.762	.2169	-.0701	.0038	.0060	-.0016	14.55	.743	.2119	-.0646	.0045	.0142	-.0039
16.56	.753	.2434	-.0946	.0039	.0049	-.0024	16.59	.789	.2456	-.0849	.0040	.0051	-.0027
18.56	.730	.2586	-.1093	.0036	.0040	-.0034	18.54	.711	.2491	-.1051	.0040	.0019	-.0041
$h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 0.80$							$h/c = 0.10$ $\eta_1 = 0$ $\eta_0 = 1.00$						
-2.17	-0.272	0.0661	0.0023	0.0015	0.0238	0.0081	-2.18	-0.308	0.0755	0.0058	0.0024	0.0301	0.0117
-.10	-.184	.0570	.0045	.0019	.0235	.0068	-.09	-.192	.0664	.0023	.0021	.0306	.0107
1.97	-.065	.0553	.0129	.0008	.0266	.0063	1.97	-.096	.0627	.0169	.0016	.0311	.0092
4.04	.027	.0567	.0167	.0003	.0264	.0032	4.04	.003	.0635	.0204	.0004	.0336	.0075
6.14	.162	.0684	.0135	.0003	.0242	.0039	6.13	.130	.0721	.0229	.0004	.0312	.0055
8.27	.348	.0928	.0001	.0003	.0154	.0028	8.27	.330	.0927	.0043	.0003	.0185	.0031
10.37	.499	.1270	-.0100	.0003	.0110	.0012	10.38	.486	.1283	-.0167	.0003	.0139	.0008
12.47	.633	.1747	-.0430	.0032	.0099	-.0009	12.48	.630	.1709	-.0356	.0030	.0101	-.0013
14.54	.731	.2114	-.0698	.0058	.0101	-.0044	14.55	.738	.2112	-.0606	.0035	.0080	-.0037
16.60	.799	.2495	-.0863	.0046	.0055	-.0041	16.57	.766	.2371	-.0789	.0028	-.0001	-.0030
18.55	.725	.2468	-.0935	.0049	.0002	-.0044	18.54	.721	.2533	-.0985	.0021	-.0002	-.0027
$h/c = 0.10$ $\eta_1 = 0.20$ $\eta_0 = 1.00$							$h/c = 0.10$ $\eta_1 = 0.40$ $\eta_0 = 1.00$						
-2.14	-0.255	0.0598	0.0061	0.0012	0.0261	0.0120	-2.10	-0.206	0.0434	0.0116	0.0006	0.0212	0.0101
-.06	-.147	.0515	.0162	.0006	.0281	.0109	-.03	-.102	.0371	.0163	.0006	.0225	.0090
2.01	-.044	.0490	.0180	0	.0283	.0095	2.04	.006	.0361	.0205	-.0006	.0232	.0079
4.08	.058	.0529	.0224	-.0010	.0311	.0082	4.12	.115	.0426	.0247	-.0012	.0262	.0067
6.18	.204	.0637	.0202	-.0005	.0286	.0058	6.24	.286	.0577	.0217	-.0013	.0208	.0046
8.33	.417	.0869	.0024	-.0009	.0164	.0033	8.36	.453	.0840	.0013	-.0008	.0109	.0032
10.46	.589	.1231	-.0145	.0003	.0102	.0010	10.47	.613	.1244	-.0173	.0003	.0053	.0019
12.54	.716	.1666	-.0357	-.0004	.0070	-.0011	12.55	.727	.1662	-.0349	.0008	-.0005	.0006
14.59	.791	.2113	-.0649	.0010	-.0002	-.0018	14.61	.824	.2130	-.0597	.0017	.0025	-.0028
16.61	.816	.2433	-.0831	.0039	-.0016	-.0036	16.59	.797	.2470	-.1004	.0018	-.0028	-.0023
18.52	.695	.2462	-.1041	.0008	-.0001	-.0029	18.48	.639	.2304	-.0985	.0003	.0013	-.0009



TABLE VII.- AERODYNAMIC CHARACTERISTICS OF MODEL 1 - Concluded  
 (c)  $x_B/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$ $\eta_1 = 0.60$ $\eta_0 = 1.00$							$h/c = 0.10$ $\eta_1 = 0.80$ $\eta_0 = 1.00$						
-2.08	-0.170	0.0301	0.0090	0.0013	0.0125	0.0069	-2.05	-0.132	0.0185	0.0093	0.0013	0.0048	0.0033
0	-.052	.0251	.0161	.0006	.0135	.0064	.03	-.016	.0154	.0108	.0008	.0058	.0031
2.08	.057	.0264	.0167	0	.0147	.0056	2.11	.096	.0183	.0147	.0003	.0064	.0029
4.16	.168	.0345	.0217	-.0004	.0171	.0047	4.19	.216	.0286	.0180	0	.0071	.0022
6.27	.324	.0522	.0181	-.0014	.0118	.0035	6.29	.352	.0484	.0154	-.0009	.0045	.0022
8.37	.472	.0830	.0030	-.0010	.0081	.0030	8.38	.487	.0813	.0050	-.0010	.0031	.0026
10.46	.605	.1237	-.0182	.0001	.0039	.0021	10.47	.617	.1223	-.0122	.0001	.0017	.0022
12.55	.734	.1704	-.0427	.0012	-.0011	.0010	12.55	.732	.1698	-.0373	.0012	.0007	.0008
14.60	.807	.2167	-.0692	.0035	-.0028	-.0014	14.59	.797	.2178	-.0704	.0022	-.0034	.0001
16.61	.818	.2535	-.0907	.0018	-.0035	-.0007	16.61	.813	.2524	-.0902	-.0003	-.0009	.0004
18.49	.645	.2319	-.0942	.0005	.0001	0	18.48	.627	.2300	-.0987	.0004	-.0006	.0002
$h/c = 0.10$ $\eta_1 = 0.40$ $\eta_0 = 0.80$							$h/c = 0.15$ $\eta_1 = 0$ $\eta_0 = 1.00$						
-2.09	-0.188	0.0340	0.0071	0.0004	0.0140	0.0063	-2.23	-0.393	0.1125	0.0134	0.0005	0.0407	0.0193
-.01	-.076	.0291	.0128	0	.0142	.0057	-.16	-.288	.1003	.0181	.0010	.0408	.0173
2.06	.030	.0298	.0127	-.0005	.0160	.0052	1.91	-.186	.0907	.0219	.0003	.0417	.0158
4.14	.147	.0370	.0181	-.0006	.0179	.0040	3.98	-.091	.0910	.0251	-.0012	.0438	.0138
6.25	.301	.0533	.0119	-.0009	.0124	.0032	6.06	.027	.0957	.0274	-.0009	.0446	.0111
8.38	.482	.0811	-.0007	-.0001	.0050	.0013	8.17	.187	.1044	.0252	-.0013	.0401	.0079
10.48	.628	.1201	-.0179	.0005	.0021	-.0003	10.32	.396	.1276	-.0021	.0005	.0265	.0026
12.58	.780	.1663	-.0411	.0012	.0015	-.0015	12.43	.554	.1676	-.0309	.0015	.0179	-.0002
14.61	.818	.2120	-.0598	.0021	.0005	-.0025	14.50	.666	.2166	-.0553	.0014	.0105	-.0007
16.59	.788	.2438	.0956	.0021	.0013	-.0027	16.57	.756	.2534	-.0729	.0018	.0017	-.0015
18.49	.646	.2324	-.0985	.0013	.0006	-.0016	18.58	.778	.2724	-.0908	.0038	.0014	-.0048

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TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2

WITH VERTICAL TAIL REMOVED

(a)  $x_B/c = 0.70$ ;  $h/c = 0$  and  $0.05$ 

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.04	-0.110	0.0129	0.0105	-0.0001	-0.0009	0.0003
.04	.005	.0111	.0104	-.0004	-.0004	-.0001
2.12	.113	.0133	.0098	-.0004	-.0003	-.0002
4.20	.226	.0181	.0061	-.0004	-.0006	-.0002
6.28	.346	.0267	.0029	-.0006	-.0005	-.0001
8.37	.468	.0443	-.0078	.0022	.0010	-.0027
10.46	.607	.0866	-.0150	.0026	-.0024	-.0004
12.54	.716	.1414	-.0049	.0030	-.0021	-.0004
14.60	.805	.1954	-.0094	.0018	-.0036	.0006
16.66	.887	.2534	-.0051	.0020	-.0027	-.0005
18.69	.930	.3103	-.0119	.0005	.0001	-.0014
20.71	.961	.3679	-.0371	-.0001	-.0026	.0006

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.02	-0.096	0.0148	0.0013	0.0016	-0.0017	-0.0005
.05	.011	.0132	.0031	.0010	-.0020	-.0004
2.13	.117	.0159	.0013	.0004	-.0009	-.0005
4.21	.233	.0208	-.0014	.0005	-.0007	-.0002
6.29	.349	.0301	-.0074	-.0004	-.0002	-.0002
8.37	.472	.0479	-.0180	.0027	.0004	-.0013
10.46	.596	.0889	-.0258	.0017	-.0024	-.0003
12.54	.712	.1419	-.0123	.0037	-.0028	-.0002
14.60	.808	.1986	-.0194	.0014	-.0025	-.0005
16.65	.896	.2580	-.0103	.0010	-.0054	.0008
18.69	.937	.3107	-.0056	.0010	-.0018	-.0006
20.70	.948	.3648	-.0431	-.0009	.0014	.0003

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.03	-0.112	0.0208	-0.0040	-0.0004	0.0003	0.0005
.04	-.012	.0195	-.0037	-.0005	.0003	.0008
2.12	.102	.0219	-.0018	-.0014	.0012	.0006
4.19	.206	.0264	-.0041	-.0029	.0035	.0006
6.27	.322	.0349	-.0068	-.0015	.0027	.0004
8.35	.437	.0500	-.0162	.0009	.0068	-.0013
10.44	.573	.0885	-.0237	.0013	.0014	-.0016
12.52	.680	.1407	-.0180	.0051	-.0004	-.0015
14.59	.795	.2006	-.0237	.0023	-.0046	0
16.63	.870	.2541	-.0062	.0017	-.0012	-.0006
18.68	.915	.3100	-.0093	-.0017	.0008	-.0008
20.69	.929	.3607	-.0427	-.0008	.0030	-.0008

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.04	-0.129	0.0266	-0.0006	-0.0017	0.0031	0.0020
.03	-.024	.0250	.0030	-.0035	.0046	.0020
2.10	.069	.0366	.0053	-.0049	.0073	.0018
4.17	.177	.0304	0	-.0059	.0089	.0020
6.25	.298	.0380	-.0012	-.0061	.0088	.0014
8.32	.407	.0529	-.0123	-.0031	.0126	-.0004
10.41	.540	.0860	-.0196	.0005	.0077	-.0013
12.52	.682	.1458	-.0153	-.0004	.0004	.0006
14.58	.789	.2019	-.0166	-.0014	.0019	-.0005
16.64	.871	.2543	-.0042	-.0008	.0010	-.0006
18.68	.918	.3080	.0011	-.0031	.0034	-.0015
20.69	.937	.3613	-.0345	-.0004	-.0014	-.0007

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.05	-0.139	0.0307	0.0038	-0.0036	0.0079	0.0040
.02	-.035	.0289	.0038	-.0049	.0086	.0035
2.09	.065	.0302	.0093	-.0067	.0110	.0035
4.17	.175	.0337	.0065	-.0081	.0129	.0034
6.24	.278	.0405	.0053	-.0093	.0149	.0028
8.32	.398	.0549	-.0055	-.0056	.0184	.0005
10.41	.543	.0990	-.0136	-.0034	.0120	-.0002
12.51	.678	.1441	-.0146	-.0009	.0034	.0003
14.58	.781	.2018	-.0209	-.0008	.0028	-.0002
16.63	.861	.2522	-.0163	-.0005	.0009	-.0007
18.68	.919	.3104	-.0037	-.0018	.0032	-.0022
20.69	.923	.3566	-.0424	.0013	.0020	-.0017

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.06	-0.141	0.0339	0.0091	-0.0054	0.0107	0.0053
.01	-.045	.0320	.0085	-.0070	.0129	.0055
2.09	.065	.0326	.0120	-.0083	.0147	.0055
4.15	.165	.0357	.0121	-.0108	.0173	.0055
6.23	.273	.0420	.0111	-.0121	.0193	.0045
8.32	.396	.0556	.0042	-.0102	.0207	.0028
10.41	.536	.0899	-.0100	-.0031	.0155	-.0001
12.51	.682	.1447	-.0149	.0004	.0059	-.0005
14.58	.778	.1975	-.0123	-.0008	.0035	-.0004
16.64	.868	.2542	-.0088	-.0010	.0018	.0001
18.68	.926	.3104	-.0031	-.0013	.0015	-.0008
20.71	.958	.3651	-.0341	.0040	.0003	-.0028

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.05	-0.133	0.0325	0.0082	-0.0073	0.0079	0.0057
.03	-.030	.0311	.0104	-.0097	.0105	.0058
2.10	.072	.0323	.0119	-.0110	.0123	.0056
4.17	.181	.0358	.0105	-.0137	.0150	.0055
6.24	.289	.0426	.0092	-.0138	.0159	.0048
8.33	.411	.0576	.0033	-.0138	.0211	.0027
10.42	.549	.0911	-.0097	-.0032	.0150	.0004
12.52	.678	.1466	-.0136	-.0034	.0046	.0009
14.59	.798	.2037	-.0193	-.0039	.0031	.0009
16.64	.872	.2573	-.0074	-.0005	.0006	.0003
18.67	.904	.3051	-.0053	-.0017	.0032	-.0021
20.70	.938	.3594	-.0448	.0017	.0003	-.0030

TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(b)  $x_B/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_Z$	$C_N$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_Z$	$C_N$
$h/c = 0.05 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.05 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.04	-0.127	0.0264	0.0110	-0.0056	0.0032	0.0051	-2.03	-0.117	0.0207	0.0068	-0.0031	0.0002	0.0039
.05	-.021	.0246	.0123	-.0066	.0054	.0051	.04	-.007	.0192	.0076	-.0042	.0017	.0037
2.11	.082	.0261	.0121	-.0077	.0067	.0047	2.12	.097	.0209	.0116	-.0050	.0028	.0032
4.18	.195	.0299	.0111	-.0098	.0098	.0048	4.20	.213	.0253	.0089	-.0061	.0044	.0035
6.26	.307	.0379	.0066	-.0106	.0108	.0040	6.27	.326	.0335	.0050	-.0074	.0062	.0029
8.34	.425	.0529	.0022	-.0082	.0133	.0023	8.35	.442	.0495	-.0052	-.0057	.0088	.0014
10.44	.583	.0915	-.0161	-.0025	.0051	.0018	10.46	.603	.0901	-.0178	.0004	.0004	.0013
12.53	.710	.1458	-.0061	-.0007	.0020	.0008	12.53	.706	.1392	-.0054	.0023	.0009	.0015
14.58	.790	.1944	-.0123	.0013	-.0001	-.0008	14.59	.799	.1941	-.0150	.0022	-.0002	-.0014
16.64	.876	.2509	-.0049	.0023	-.0011	-.0016	16.64	.871	.2498	-.0070	.0037	-.0018	-.0012
18.67	.933	.3032	-.0105	-.0002	.0011	-.0023	18.68	.924	.3054	-.0051	-.0004	.0003	-.0013
20.70	.941	.3609	-.0456	.0005	-.0069	.0003	20.70	.943	.3609	-.0421	.0019	-.0050	.0016
$h/c = 0.05 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$							$h/c = 0.05 \quad \eta_1 = 0.20 \quad \eta_0 = 0.60$						
-2.03	-0.106	0.0163	0.0066	-0.0015	-0.0018	0.0019	-2.04	-0.132	0.0254	0.0039	-0.0050	0.0023	0.0029
.05	.003	.0147	.0092	-.0018	-.0019	.0020	.03	-.023	.0240	.0018	-.0052	.0030	.0026
2.12	.108	.0167	.0070	-.0026	-.0008	.0018	2.10	.076	.0260	.0039	-.0067	.0049	.0024
4.20	.226	.0216	.0078	-.0036	.0007	.0022	4.18	.189	.0301	.0017	-.0081	.0069	.0025
6.28	.336	.0300	.0011	-.0036	.0010	.0016	6.25	.300	.0379	-.0005	-.0086	.0087	.0022
8.36	.452	.0465	-.0104	-.0023	.0031	.0001	8.33	.415	.0522	-.0088	-.0078	.0114	.0003
10.46	.606	.0863	-.0135	.0035	-.0020	.0006	10.42	.558	.0877	-.0171	-.0001	.0069	-.0003
12.53	.706	.1384	-.0058	.0028	-.0012	-.0009	12.52	.693	.1463	-.0133	-.0028	.0019	.0015
14.59	.796	.1944	-.0147	.0023	-.0011	-.0007	14.58	.791	.2014	-.0179	-.0043	.0027	.0011
16.64	.884	.2519	-.0050	.0033	-.0022	-.0008	16.64	.879	.2578	-.0055	-.0016	.0008	.0005
18.68	.927	.3088	-.0107	-.0011	.0029	-.0018	18.68	.914	.3048	-.0020	-.0039	.0053	.0027
20.70	.941	.3631	-.0459	-.0022	-.0018	.0010	20.70	.940	.3595	-.0379	-.0020	-.0029	.0006
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.20$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$						
-2.03	-0.095	0.0169	0.0014	0.0005	0.0003	-0.0004	-2.07	-0.154	0.0312	0.0038	-0.0029	0.0068	0.0015
.05	.016	.0156	.0003	0	-.0006	-.0005	0	-.051	.0293	.0032	-.0027	.0078	.0014
2.12	.120	.0177	-.0006	-.0012	.0004	-.0002	2.08	.055	.0308	.0023	-.0036	.0086	.0012
4.20	.231	.0228	-.0011	-.0018	.0011	-.0001	4.15	.161	.0342	.0011	-.0028	.0096	.0004
6.28	.340	.0310	-.0062	-.0004	.0007	-.0005	6.23	.272	.0418	-.0039	-.0028	.0100	-.0004
8.36	.462	.0485	-.0146	.0025	.0017	-.0030	8.31	.386	.0553	-.0093	.0008	.0130	-.0040
10.45	.592	.0885	-.0206	.0047	-.0011	-.0024	10.40	.511	.0870	-.0154	.0059	.0121	-.0053
12.53	.707	.1424	-.0149	.0070	-.0018	-.0025	12.49	.642	.1415	-.0178	.0077	.0058	-.0050
14.59	.794	.1947	-.0116	.0039	0	-.0027	14.57	.759	.1982	-.0172	.0047	-.0001	-.0032
16.66	.884	.2537	-.0100	.0030	-.0035	.0002	16.62	.826	.2493	-.0044	.0044	.0056	-.0050
18.69	.928	.3093	-.0059	.0009	-.0033	-.0004	18.66	.892	.3069	.0033	-.0022	.0092	-.0048
20.69	.938	.3632	-.0374	.0024	.0011	-.0007	20.70	.948	.3665	-.0289	-.0008	.0027	-.0024
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.80$						
-2.09	-0.193	0.0410	0.0096	-0.0061	0.0119	0.0044	-2.10	-0.207	0.0497	0.0174	-0.0087	0.0195	0.0077
-.02	-.089	.0389	.0078	-.0067	.0142	.0040	-.04	-.112	.0473	.0173	-.0108	.0211	.0078
2.05	.018	.0385	.0102	-.0080	.0158	.0033	2.04	-.004	.0464	.0161	-.0126	.0241	.0071
4.13	.123	.0421	.0078	-.0082	.0175	.0026	4.11	.101	.0493	.0180	-.0150	.0258	.0068
6.21	.242	.0480	.0056	-.0092	.0186	.0025	6.18	.207	.0541	.0156	-.0157	.0271	.0058
8.28	.351	.0595	.0014	-.0076	.0192	0	8.26	.317	.0639	.0117	-.0139	.0309	.0024
10.37	.473	.0875	-.0062	.0015	.0216	-.0043	10.34	.436	.0874	.0087	-.0031	.0326	-.0042
12.48	.634	.1451	-.0080	.0018	.0107	-.0033	12.46	.605	.1428	-.0050	.0012	.0178	-.0037
14.53	.711	.1935	-.0022	.0001	.0133	-.0040	14.63	.702	.1920	-.0032	0	.0152	-.0045
16.60	.810	.2491	.0026	.0009	.0112	-.0056	16.60	.800	.2452	.0007	.0013	.0081	-.0054
18.66	.889	.3069	-.0026	-.0001	.0054	-.0038	18.66	.894	.3067	.0003	.0008	.0056	-.0041
20.70	.946	.3628	-.0232	.0013	.0001	-.0017	20.69	.936	.3612	-.0236	.0003	-.0010	-.0008

TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(c)  $x_B/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.20 \quad \eta_0 = 1.00$						
-2.11	-0.209	0.0567	0.0200	-0.0106	0.0228	0.0108	-2.09	-0.188	0.0540	0.0182	-0.0142	0.0200	0.0118
-.03	-.106	.0537	.0224	-.0130	.0257	.0102	-.03	-.096	.0510	.0245	-.0159	.0233	.0116
2.04	-.006	.0529	.0216	-.0155	.0280	.0102	2.05	.008	.0513	.0237	-.0188	.0252	.0115
4.10	.093	.0546	.0207	-.0179	.0310	.0094	4.12	.112	.0533	.0273	-.0209	.0298	.0105
6.18	.199	.0584	.0219	-.0195	.0334	.0083	6.19	.214	.0575	.0255	-.0222	.0311	.0093
8.26	.314	.0695	.0170	-.0174	.0362	.0046	8.27	.325	.0670	.0218	-.0194	.0331	.0061
10.34	.432	.0944	.0105	-.0065	.0386	-.0021	10.35	.447	.0928	.0172	-.0097	.0380	-.0013
12.47	.613	.1455	-.0028	-.0004	.0173	-.0037	12.47	.615	.1428	.0007	-.0040	.0170	-.0013
14.53	.709	.1925	-.0017	-.0004	.0149	-.0050	14.54	.725	.1946	-.0003	-.0057	.0136	-.0012
16.60	.807	.2465	.0046	.0001	.0113	-.0053	16.63	.848	.2555	-.0024	-.0063	.0079	-.0009
18.65	.882	.3040	-.0042	.0025	.0072	-.0052	18.67	.908	.3080	-.0065	-.0039	.0025	-.0005
20.70	.942	.3618	-.0300	.0033	-.0004	-.0020	20.70	.942	.3549	-.0298	.0073	-.0037	-.0029
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.06	-0.149	0.0425	0.0163	-0.0133	0.0112	0.0116	-2.05	-0.126	0.0305	0.0130	-0.0076	0.0058	0.0083
0	-.051	.0393	.0173	-.0140	.0145	.0111	.03	-.019	.0283	.0140	-.0096	.0087	.0087
2.08	.055	.0396	.0216	-.0164	.0173	.0112	2.10	.083	.0291	.0166	-.0105	.0102	.0084
4.15	.159	.0422	.0229	-.0182	.0201	.0103	4.17	.193	.0321	.0171	-.0120	.0130	.0081
6.22	.264	.0481	.0209	-.0208	.0235	.0099	6.25	.307	.0389	.0162	-.0138	.0147	.0075
8.30	.379	.0613	.0614	-.0167	.0252	.0065	8.33	.423	.0541	.0100	-.0095	.0166	.0049
10.40	.318	.0925	.0026	-.0085	.0214	.0017	10.45	.587	.0917	-.0112	-.0029	.0058	.0024
12.52	.689	.1456	-.0044	-.0038	.0071	.0013	12.53	.704	.1391	-.0070	.0029	.0018	-.0007
14.59	.792	.1942	-.0038	-.0007	.0035	-.0015	14.59	.796	.1903	-.0080	.0034	.0011	-.0021
16.64	.866	.2463	-.0063	.0038	-.0013	-.0023	16.64	.860	.2449	-.0124	.0021	-.0013	-.0018
18.68	.926	.3039	-.0108	.0022	-.0028	-.0017	18.68	.922	.3057	-.0158	.0012	-.0006	-.0013
20.71	.958	.3611	-.0474	.0071	-.0070	-.0019	20.71	.957	.3607	-.0386	.0029	-.0075	-.0001
$h/c = 0.10 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.20 \quad \eta_0 = 0.60$						
-2.04	-0.109	0.0207	0.0094	-0.0035	0.0020	0.0048	-2.09	-0.190	0.0389	0.0167	-0.0083	0.0100	0.0052
.04	.002	.0186	.0113	-.0040	.0037	.0047	-.02	-.093	.0362	.0165	-.0087	.0118	.0045
2.12	.113	.0200	.0121	-.0053	.0033	.0046	2.06	.011	.0367	.0177	-.0093	.0138	.0039
4.19	.223	.0245	.0116	-.0071	.0065	.0047	4.13	.123	.0403	.0152	-.0101	.0163	.0037
6.27	.331	.0322	.0066	-.0075	.0062	.0044	6.20	.230	.0473	.0137	-.0121	.0182	.0026
8.36	.462	.0494	-.0016	-.0027	.0065	.0019	8.28	.346	.0597	.0057	-.0128	.0234	.0008
10.46	.611	.0869	-.0131	.0019	-.0001	-.0007	10.37	.480	.0861	.0038	.0017	.0207	-.0039
12.54	.718	.1401	-.0040	.0038	-.0004	-.0011	12.48	.627	.1410	-.0049	-.0038	.0092	-.0012
14.59	.791	.1905	-.0098	.0017	-.0009	-.0010	14.54	.730	.1989	-.0049	-.0066	.0146	-.0013
16.64	.872	.2506	-.0103	.0009	-.0001	-.0014	16.62	.843	.2571	.0003	-.0038	.0079	-.0016
18.69	.931	.3070	-.0073	-.0018	-.0009	-.0004	18.67	.913	.3104	.0041	-.0047	.0069	-.0018
20.69	.937	.3571	-.0381	.0023	-.0002	-.0013	20.70	.945	.3602	-.0329	-.0013	-.0027	-.0003
$h/c = 0.10 \quad \eta_1 = 0.4 \quad \eta_0 = 0.6$							$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.20$						
-2.06	-0.142	0.0266	0.0102	-0.0067	0.0061	0.0044	-2.03	-0.105	0.0191	0.0015	0	0.0013	-0.0006
.02	-.034	.0247	.0109	-.0075	.0075	.0041	.04	.001	.0177	-.0005	-.0005	.0011	-.0006
2.09	.073	.0263	.0113	-.0085	.0086	.0044	2.12	.111	.0200	-.0004	-.0005	.0021	-.0006
4.16	.179	.0304	.0132	-.0100	.0116	.0040	4.19	.219	.0247	-.0024	.0003	.0014	-.0012
6.25	.296	.0377	.0097	-.0109	.0119	.0040	6.27	.332	.0333	-.0084	-.0013	.0035	-.0012
8.32	.409	.0522	.0045	-.0080	.0144	.0015	8.35	.452	.0496	-.0138	.0052	.0030	-.0041
10.42	.551	.0880	-.0056	-.0049	.0101	.0007	10.44	.579	.0882	-.0206	.0072	.0015	-.0040
12.53	.704	.1489	-.0055	-.0041	.0057	.0023	12.52	.694	.1424	-.0173	.0090	-.0008	-.0048
14.59	.787	.1935	-.0068	-.0010	.0035	-.0008	14.58	.771	.1937	-.0185	.0061	-.0011	-.0037
16.65	.873	.2494	-.0052	.0017	0	-.0009	16.65	.873	.2535	-.0124	.0060	-.0059	-.0019
18.68	.925	.3065	-.0089	.0019	-.0003	-.0011	18.68	.924	.3118	-.0092	.0031	-.0050	-.0009
20.71	.957	.3664	-.0450	.0010	-.0018	-.0010	20.71	.957	.3690	-.0225	.0019	-.0010	-.0015

TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED - Continued  
(d)  $x_B/c = 0.70$ ;  $h/c = 0.15$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$
$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$							$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$						
-2.09	-0.189	0.0412	0.0053	-0.0017	0.0111	0.0010	-2.12	-0.235	0.0565	0.0173	-0.0081	0.0212	0.0056
-.02	-.084	.0386	.0064	-.0030	.0114	.0006	-.05	-.129	.0539	.0169	-.0102	.0218	.0055
2.06	.022	.0395	.0048	-.0033	.0128	.0004	2.02	-.024	.0525	.0148	-.0121	.0239	.0047
4.13	.127	.0428	.0038	-.0036	.0154	-.0009	4.09	.078	.0564	.0143	-.0136	.0259	.0041
6.20	.233	.0489	-.0011	-.0041	.0165	-.0016	6.17	.188	.0625	.0106	-.0150	.0278	.0031
8.28	.349	.0634	-.0105	-.0022	.0207	-.0047	8.25	.294	.0727	.0068	-.0138	.0310	0
10.37	.477	.0920	-.0180	.0070	.0187	-.0094	10.33	.416	.0967	-.0023	-.0022	.0323	-.0070
12.46	.608	.1446	-.0175	.0052	.0095	-.0071	12.43	.565	.1509	-.0094	-.0005	.0208	-.0052
14.54	.714	.1964	-.0226	.0050	.0043	-.0060	14.49	.652	.1985	.0014	-.0048	.0216	-.0053
16.59	.796	.2497	-.0096	.0056	.0002	-.0062	16.57	.760	.2483	.0069	-.0010	.0193	-.0086
18.64	.858	.3052	.0101	-.0004	.0098	-.0070	18.64	.899	.3071	.0041	-.0018	.0131	-.0074
20.69	.935	.3691	-.0143	-.0012	.0031	-.0037	20.68	.926	.3651	-.0205	.0045	.0007	-.0050
$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.80$							$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$						
-2.14	-0.252	0.0692	0.0275	-0.0138	0.0269	0.0105	-2.13	-0.249	0.0790	0.0299	-0.0189	0.0298	0.0162
-.07	-.158	.0645	.0286	-.0156	.0296	.0100	-.07	-.157	.0743	.0326	-.0195	.0328	.0148
2.00	-.052	.0641	.0254	-.0191	.0312	.0100	2.00	-.057	.0738	.0342	-.0229	.0363	.0147
4.08	.058	.0655	.0244	-.0205	.0337	.0088	4.08	.051	.0759	.0323	-.0256	.0377	.0142
6.15	.158	.0704	.0216	-.0217	.0355	.0074	6.15	.151	.0781	.0316	-.0299	.0429	.0128
8.23	.268	.0793	.0155	-.0215	.0404	.0040	8.22	.254	.0844	.0269	-.0277	.0438	.0088
10.31	.395	.1040	.0092	-.0129	.0414	-.0012	10.30	.378	.1083	.0176	-.0182	.0461	.0020
12.42	.549	.1505	-.0017	-.0021	.0307	-.0062	12.42	.546	.1493	.0026	-.0066	.0281	-.0035
14.49	.649	.1966	.0037	-.0044	.0223	-.0066	14.49	.650	.1967	.0005	-.0040	.0247	-.0069
16.57	.757	.2458	.0097	.0009	.0146	-.0084	16.57	.762	.2463	.0087	.0007	.0180	-.0087
18.64	.859	.3043	.0031	-.0001	.0093	-.0071	18.64	.867	.3053	.0063	.0018	.0116	-.0091
20.69	.940	.3676	-.0191	.0018	.0021	-.0052	20.69	.933	.3652	-.0132	.0050	.0018	-.0055
$h/c = 0.15 \quad \eta_1 = 0.20 \quad \eta_0 = 1.00$							$h/c = 0.15 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$						
-2.14	-0.263	0.0756	0.0392	-0.0219	0.0286	0.0175	-2.09	-0.199	0.0577	0.0315	-0.0207	0.0185	0.0173
-.07	-.164	.0723	.0401	-.0227	.0311	.0164	-.02	-.094	.0548	.0326	-.0222	.0212	.0169
2.00	-.068	.0722	.0453	-.0244	.0326	.0155	2.05	-.001	.0542	.0367	-.0245	.0242	.0162
4.07	.039	.0722	.0428	-.0266	.0369	.0140	4.12	.103	.0561	.0352	-.0268	.0270	.0156
6.14	.142	.0753	.0406	-.0274	.0411	.0122	6.19	.209	.0610	.0332	-.0283	.0301	.0141
8.22	.256	.0845	.0350	-.0295	.0441	.0099	8.27	.332	.0725	.0558	-.0302	.0351	.0115
10.31	.389	.1087	.0304	-.0170	.0442	.0033	10.36	.461	.0985	.0235	-.0166	.0346	.0057
12.42	.550	.1504	.0132	-.0107	.0309	-.0015	12.49	.640	.1453	.0120	-.0091	.0153	.0016
14.51	.677	.1989	.0122	-.0072	.0222	-.0033	14.59	.796	.2012	-.0126	-.0015	.0035	-.0004
16.58	.786	.2494	.0154	-.0022	.0123	-.0045	16.64	.881	.2496	-.0023	.0051	.0002	-.0027
18.65	.882	.3047	.0124	-.0043	.0077	-.0041	18.68	.923	.3018	-.0080	.0041	-.0015	-.0030
20.71	.953	.3699	-.0301	-.0018	-.0022	-.0005	20.70	.950	.3572	-.0461	.0052	-.0088	-.0007
$h/c = 0.15 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$							$h/c = 0.15 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$						
-2.06	-0.155	0.0408	0.0242	-0.0126	0.0106	0.0133	-2.04	-0.131	0.0256	0.0184	-0.0055	0.0034	0.0073
.01	-.049	.0370	.0262	-.0134	.0131	.0127	.03	-.023	.0231	.0183	-.0064	.0049	.0067
2.08	.051	.0376	.0279	-.0155	.0149	.0122	2.11	.085	.0247	.0203	-.0074	.0064	.0066
4.16	.159	.0406	.0265	-.0178	.0175	.0119	4.19	.198	.0284	.0196	-.0095	.0086	.0069
6.23	.267	.0472	.0240	-.0189	.0202	.0109	6.25	.298	.0353	.0142	-.0105	.0096	.0062
8.31	.392	.0616	.0166	-.0195	.0240	.0087	8.34	.436	.0529	.0058	-.0090	.0122	.0040
10.43	.566	.0954	-.0047	-.0068	.0107	.0047	10.45	.596	.0894	-.0135	.0034	.0001	.0002
12.53	.702	.1402	-.0047	.0013	.0015	-.0007	12.53	.702	.1384	-.0046	.0033	-.0013	-.0009
14.59	.801	.1937	-.0145	.0039	-.0025	-.0015	14.59	.800	.1941	-.0133	.0023	-.0017	-.0009
16.64	.884	.2491	-.0029	.0051	-.0020	-.0030	16.64	.884	.2517	-.0006	.0044	-.0047	-.0011
18.68	.926	.3039	.0106	.0013	-.0048	-.0018	18.68	.924	.3051	-.0040	0	.0002	-.0017
20.71	.962	.3638	-.0478	.0008	-.0086	.0011	20.71	.962	.3643	-.0343	.0023	-.0041	-.0015

TABLE VIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 2  
WITH VERTICAL TAIL REMOVED

(d)  $x_B/c = 0.70$ ;  $h/c = 0.15$  - Concluded

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.15$			$\eta_1 = 0.20$		$\eta_0 = 0.60$	
-2.12	-0.241	0.0540	0.0262	-0.0124	0.0176	0.0076
-.05	-.141	.0503	.0266	-.0124	.0199	.0068
2.02	-.039	.0514	.0251	-.0131	.0219	.0055
4.10	.070	.0541	.0254	-.0153	.0239	.0048
6.17	.175	.0601	.0246	-.0153	.0260	.0036
8.25	.294	.0699	.0166	-.0181	.0308	.0024
10.33	.422	.0968	.0121	-.0043	.0316	-.0042
12.45	.579	.1473	.0140	-.0081	.0193	-.0017
14.50	.666	.2004	.0065	-.0079	.0214	-.0031
16.58	.799	.2548	.0158	-.0065	.0140	-.0035
18.66	.888	.3094	.0133	-.0079	.0104	-.0029
20.71	.963	.3733	-.0291	-.0054	-.0021	.0008

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TABLE IX.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE;  $x_B/c = 0.70$ ;  $h/c = 0$  AND  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.05	-0.129	0.0148	0.0011	-0.0039	-0.0004	0.0014
.03	-.020	.0127	.0007	-.0031	-.0018	.0011
2.10	.088	.0140	0	-.0026	.0001	.0014
4.19	.210	.0177	.0035	-.0033	.0004	.0015
6.26	.321	.0259	.0011	-.0013	-.0001	.0004
8.35	.439	.0367	-.0021	.0003	-.0004	-.0004
10.43	.558	.0519	-.0089	-.0005	.0001	.0001
12.52	.686	.0711	-.0139	-.0004	.0003	.0004
14.60	.800	.0927	-.0165	.0018	-.0012	0
16.68	.926	.1238	-.0219	.0005	-.0018	.0008
18.49	1.009	.2114	-.0201	-.0021	.0030	.0002
20.76	1.034	.3027	-.0198	.0001	.0005	.0009
$h/c = 0.10$			$\eta_1 = 0.15$		$\eta_0 = 1.00$	
-2.13	-0.241	0.0577	0.0061	-0.0180	0.0239	0.0144
-.06	-.139	.0540	.0138	-.0174	.0236	.0126
2.07	-.042	.0522	.0184	-.0190	.0266	.0119
4.08	.060	.0537	.0177	-.0230	.0287	.0122
6.16	.169	.0579	.0211	-.0214	.0312	.0102
8.24	.281	.0650	.0184	-.0240	.0344	.0094
10.31	.392	.0758	.0172	-.0233	.0354	.0069
12.40	.516	.0891	.0160	-.0274	.0380	.0055
14.48	.635	.1061	.0112	-.0248	.0363	.0031
16.57	.762	.1326	.0027	-.0290	.0353	.0028
18.66	.892	.2011	-.0168	-.0060	.0268	-.0067
20.70	.950	.2758	.0008	.0088	.0140	-.0061

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TABLE X.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED  
(a)  $x_B/c = 0.70$ ;  $h/c = 0, 0.05$ , and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.06	-0.137	0.0135	-0.0010	-0.0010	0.0012	0.0003
.02	-.023	.0115	.0030	-.0006	.0007	-.0001
2.10	.087	.0127	.0008	-.0006	.0008	-.0003
4.19	.214	.0170	.0021	0	.0003	-.0004
6.27	.327	.0246	.0013	0	.0007	-.0003
8.35	.442	.0359	-.0028	.0003	.0005	-.0003
10.43	.567	.0512	-.0069	-.0006	.0008	-.0001
12.52	.685	.0700	-.0136	.0012	-.0005	-.0006
14.60	.809	.0931	-.0188	.0001	.0001	-.0004
16.69	.937	.1222	-.0221	.0026	0	-.0007
18.76	1.032	.2099	-.0330	-.0024	.0044	-.0002
20.77	1.043	.2964	-.0247	-.0014	.0013	-.0005

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$ $\eta_1 = 0.15$ $\eta_0 = 0.40$						
-2.05	-0.133	0.0216	-0.0097	-0.0021	0.0012	0.0005
.02	-.025	.0196	-.0074	-.0022	.0020	.0007
2.10	.087	.0210	-.0056	-.0018	.0019	.0007
4.19	.191	.0250	-.0074	-.0019	.0035	.0007
6.25	.303	.0324	-.0072	-.0015	.0031	.0006
8.33	.423	.0439	-.0116	-.0019	.0036	.0006
10.41	.535	.0583	-.0160	-.0019	.0039	.0004
12.50	.661	.0758	-.0182	-.0027	.0049	.0002
14.58	.771	.0970	-.0213	-.0031	.0063	-.0004
16.66	.884	.1238	-.0263	-.0018	.0072	-.0021
18.74	1.003	.1996	-.0382	.0012	.0068	-.0028
20.81	1.044	.2918	-.0176	.0041	.0033	-.0016

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$ $\eta_1 = 0.60$ $\eta_0 = 1.00$						
-2.05	-0.132	0.0217	0.0003	-0.0048	0.0017	0.0040
.03	-.029	.0195	.0037	-.0048	.0027	.0040
2.10	.080	.0206	.0060	-.0052	.0042	.0042
4.17	.192	.0243	.0064	-.0055	.0047	.0037
6.26	.310	.0317	.0042	-.0065	.0067	.0037
8.33	.424	.0426	.0006	-.0067	.0057	.0039
10.42	.550	.0573	-.0038	-.0074	.0067	.0031
12.51	.671	.0757	-.0079	-.0082	.0069	.0029
14.59	.792	.0975	-.0101	-.0078	.0064	.0033
16.70	.921	.1262	-.0137	-.0075	.0053	.0032
18.75	1.025	.2091	-.0333	-.0017	.0080	-.0011
20.76	1.036	.2975	-.0256	.0022	.0028	-.0012

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$ $\eta_1 = 0.15$ $\eta_0 = 0.40$						
-2.10	-0.187	0.0315	-0.0095	-0.0034	0.0085	0.0012
-.01	-.077	.0295	-.0062	-.0028	.0091	.0009
2.06	.029	.0352	-.0031	-.0017	.0102	0
4.13	.135	.0377	-.0022	-.0028	.0104	.0002
6.21	.249	.0437	-.0039	-.0030	.0124	0
8.29	.356	.0525	-.0100	-.0057	.0153	-.0014
10.37	.471	.0649	-.0115	-.0043	.0152	-.0016
12.43	.590	.0814	-.0158	-.0050	.0156	-.0020
14.53	.714	.1027	-.0242	-.0054	.0155	-.0031
16.62	.831	.1292	-.0272	-.0099	.0159	-.0023
18.72	.971	.1915	-.0473	-.0084	.0187	-.0029
20.74	1.004	.2751	-.0253	.0096	.0068	-.0056

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$ $\eta_1 = 0.60$ $\eta_0 = 1.00$						
-2.07	-0.152	0.0318	-0.0003	-0.0096	0.0063	0.0085
-.01	-.046	.0291	.0074	-.0100	.0081	.0083
2.08	.055	.0290	.0098	-.0106	.0104	.0079
4.20	.166	.0316	.0134	-.0115	.0133	.0073
6.23	.277	.0377	.0144	-.0130	.0148	.0071
8.31	.390	.0476	.0127	-.0134	.0157	.0072
10.39	.509	.0614	.0072	-.0164	.0168	.0066
12.57	.642	.0796	.0033	-.0173	.0172	.0066
14.57	.761	.1006	-.0004	-.0180	.0164	.0064
16.66	.888	.1284	-.0056	-.0180	.0174	.0054
18.75	1.026	.2093	-.0313	.0009	.0040	-.0018
20.77	1.042	.2921	-.0172	.0021	.0013	-.0017

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TABLE X.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED - Continued  
(b)  $x_s/c = 0.60$ ;  $h/c = 0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$						
-2.07	-0.153	0.0315	-0.0171	-0.0048	0.0044	0.0016	-2.09	-0.180	0.0413	-0.0194	-0.0084	0.0100	0.0038
0	-0.051	.0305	-.0164	-.0043	.0045	.0012	-.02	-.081	.0394	-.0113	-.0099	.0120	.0045
2.08	.055	.0368	-.0138	-.0050	.0063	.0007	2.14	.017	.0406	-.0109	-.0107	.0140	.0043
4.15	.160	.0407	-.0148	-.0055	.0084	.0008	4.13	.123	.0441	-.0095	-.0123	.0159	.0039
6.23	.296	.0474	-.0172	-.0062	.0105	.0002	6.20	.233	.0500	-.0060	-.0140	.0179	.0036
8.30	.377	.0568	-.0173	-.0073	.0116	.0005	8.27	.338	.0602	-.0094	-.0156	.0205	.0029
10.38	.489	.0705	-.0217	-.0085	.0125	-.0002	10.35	.445	.0716	-.0111	-.0176	.0232	.0021
12.46	.598	.0866	-.0264	-.0091	.0142	-.0016	12.43	.564	.0887	-.0137	-.0194	.0238	.0014
14.58	.722	.1080	-.0433	-.0110	.0147	-.0014	14.51	.676	.1097	-.0189	-.0218	.0247	.0011
16.62	.840	.1379	-.0395	-.0175	.0150	.0008	16.70	.809	.1409	-.0246	-.0269	.0247	.0025
18.71	.968	.2086	-.0516	-.0063	.0086	-.0042	18.69	.933	.1989	-.0391	-.0208	.0256	-.0029
20.74	1.002	.2837	-.0243	.0051	.0050	-.0054	20.71	.958	.2745	-.0064	-.0025	.0174	-.0060
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.80$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$						
-2.09	-0.194	0.0501	-0.0137	-0.0108	0.0159	0.0071	-2.10	-0.194	0.0568	-0.0107	-0.0132	0.0184	0.0097
-.03	-.097	.0485	-.0076	-.0132	.0172	.0070	-.03	-.104	.0547	-.0058	-.0158	.0207	.0101
2.04	.002	.0493	-.0069	-.0147	.0186	.0070	2.03	-.009	.0552	-.0070	-.0187	.0236	.0101
4.11	.100	.0512	-.0035	-.0177	.0231	.0066	4.10	.088	.0571	.0026	-.0212	.0268	.0100
6.18	.202	.0565	-.0045	-.0197	.0258	.0064	6.18	.199	.0631	.0037	-.0251	.0295	.0098
8.25	.308	.0651	-.0045	-.0213	.0282	.0056	8.25	.304	.0702	.0036	-.0277	.0335	.0092
10.33	.414	.0757	-.0047	-.0240	.0306	.0047	10.33	.410	.0806	.0043	-.0307	.0367	.0077
12.42	.544	.0924	-.0049	-.0280	.0330	.0037	12.41	.531	.0970	.0009	-.0344	.0385	.0069
14.50	.658	.1129	-.0119	-.0290	.0301	.0033	14.49	.650	.1156	-.0062	-.0372	.0403	.0043
16.59	.784	.1418	-.0221	-.0336	.0298	.0039	16.58	.782	.1447	-.0169	-.0378	.0347	.0046
18.68	.918	.2013	-.0327	-.0302	.0379	-.0003	18.68	.915	.1973	-.0305	-.0312	.0384	-.0010
20.71	.960	.2763	-.0144	-.0041	.0190	-.0064	20.71	.963	.2785	-.0192	-.0035	.0230	-.0078
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.06	-0.150	0.0440	-0.0125	-0.0166	0.0053	0.0112	-2.05	-0.126	0.0328	-0.0115	-0.0106	-0.0005	0.0088
.01	-.039	.0421	-.0044	-.0174	.0097	.0115	.03	-.021	.0310	-.0058	-.0112	.0018	.0091
2.08	.055	.0434	-.0025	-.0181	.0101	.0112	2.09	.079	.0313	-.0008	-.0116	.0044	.0088
4.15	.152	.0454	-.0002	-.0196	.0148	.0107	4.17	.182	.0343	.0015	-.0130	.0078	.0084
6.22	.261	.0514	.0042	-.0226	.0180	.0104	6.24	.292	.0408	.0058	-.0138	.0100	.0080
8.30	.375	.0609	.0066	-.0256	.0222	.0103	8.32	.407	.0513	.0028	-.0176	.0133	.0080
10.38	.482	.0735	.0023	-.0274	.0246	.0099	10.40	.523	.0656	-.0009	-.0194	.0141	.0081
12.47	.611	.0914	.0014	-.0299	.0257	.0093	12.49	.652	.0836	-.0045	-.0204	.0145	.0081
14.55	.728	.1113	.0010	-.0347	.0285	.0094	14.58	.772	.1055	-.0085	-.0222	.0146	.0085
16.63	.854	.1409	-.0148	-.0336	.0260	.0093	16.69	.898	.1353	-.0169	-.0195	.0155	.0067
18.72	.978	.2080	-.0248	-.0106	.0189	-.0002	18.76	1.034	.2059	-.0189	.0023	.0054	-.0018
20.77	1.049	.2949	-.0227	.0062	.0021	-.0030	20.77	1.047	.2962	-.0252	.0014	.0007	-.0032



TABLE X.- AERODYNAMIC CHARACTERISTICS OF MODEL 2 WITH MODIFIED  
LEADING EDGE AND VERTICAL TAIL REMOVED - Concluded  
(c)  $x_B/c = 0.80$ ;  $h/c = 0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_I$	$C_N$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_I$	$C_N$
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$						
-2.10	-0.206	0.0319	0.0079	-0.0018	0.0109	0.0015	-2.14	-0.257	0.0412	0.0121	-0.0050	0.0177	0.0042
.03	-.101	.0284	.0090	0	.0115	.0001	-.06	-.145	.0368	.0162	-.0051	.0196	.0035
2.04	.006	.0281	.0098	-.0003	.0111	-.0001	2.01	-.036	.0355	.0191	-.0038	.0198	.0022
4.12	.114	.0309	.0076	-.0008	.0132	-.0008	4.09	.073	.0371	.0158	-.0058	.0201	.0020
6.20	.228	.0364	.0116	.0004	.0133	-.0012	6.17	.190	.0416	.0190	-.0064	.0220	.0012
8.28	.344	.0457	.0096	.0014	.0129	-.0025	8.25	.303	.0498	.0164	-.0062	.0231	.0004
10.36	.466	.0592	.0043	-.0008	.0145	-.0028	10.34	.425	.0619	.0118	-.0056	.0224	-.0012
12.45	.588	.0757	.0002	-.0009	.0147	-.0035	12.42	.540	.0769	.0091	-.0066	.0234	-.0017
14.53	.699	.0956	-.0060	-.0024	.0158	-.0041	14.50	.659	.0955	.0023	-.0083	.0249	-.0030
16.61	.823	.1210	-.0068	-.0038	.0168	-.0046	16.59	.784	.1203	.0035	-.0187	.0339	-.0046
18.70	.949	.1902	-.0260	.0088	.0091	-.0083	18.69	.930	.1786	-.0204	-.0066	.0245	-.0059
20.74	1.003	.2755	-.0154	.0192	-.0012	-.0086	20.71	.962	.2685	-.0042	.0089	.0116	-.0075
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$						
-2.15	-0.276	0.0565	0.0329	-0.0087	0.0295	0.0105	-2.11	-0.210	0.0416	0.0246	-0.0118	0.0213	0.0108
-.07	-.165	.0517	.0376	-.0101	.0306	.0098	-.04	-.110	.0374	.0280	-.0131	.0210	.0104
1.99	-.076	.0489	.0365	-.0119	.0313	.0091	2.04	-.004	.0362	.0302	-.0140	.0223	.0098
4.07	.043	.0494	.0386	-.0138	.0331	.0081	4.12	.108	.0378	.0336	-.0153	.0236	.0090
6.14	.148	.0521	.0372	-.0145	.0362	.0069	6.19	.217	.0427	.0334	-.0163	.0250	.0087
8.22	.260	.0585	.0379	-.0166	.0380	.0057	8.27	.333	.0504	.0320	-.0175	.0272	.0071
10.30	.378	.0697	.0305	-.0181	.0386	.0048	10.36	.454	.0626	.0277	-.0189	.0283	.0068
12.38	.495	.0814	.0285	-.0189	.0388	.0029	12.44	.576	.0785	.0224	-.0199	.0278	.0056
14.47	.621	.1015	.0211	-.0182	.0357	.0019	14.53	.704	.0974	.0162	-.0202	.0274	.0047
16.56	.745	.1209	.0202	-.0194	.0355	0	16.62	.828	.1225	.0128	-.0197	.0264	.0032
18.67	.904	.1869	-.0116	-.0149	.0325	-.0031	18.72	.975	.2009	-.0148	-.0129	.0182	.0008
20.70	.955	.2732	.0033	.0074	.0116	-.0074	20.76	1.042	.2965	-.0182	.0053	.0015	-.0018
$h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$						
-2.08	-0.172	0.0306	0.0142	-0.0081	0.0119	0.0078	-2.06	-0.144	0.0217	-0.0042	-0.0042	0.0053	0.0044
-.01	-.065	.0275	.0186	-.0083	.0118	.0076	-.02	-.034	.0189	.0115	-.0044	.0043	.0041
2.07	.046	.0268	.0210	-.0086	.0137	.0069	2.09	.072	.0195	.0116	-.0045	.0061	.0036
4.15	.155	.0298	.0224	-.0092	.0142	.0066	4.17	.186	.0228	.0121	-.0053	.0071	.0037
6.23	.267	.0357	.0233	-.0106	.0157	.0065	6.25	.296	.0300	.0092	-.0054	.0070	.0034
8.31	.382	.0451	.0211	-.0126	.0177	.0059	8.33	.417	.0406	.0071	-.0062	.0075	.0035
10.39	.504	.0586	.0183	-.0132	.0178	.0062	10.42	.541	.0555	.0023	-.0063	.0071	.0035
12.48	.628	.0761	.0080	-.0146	.0178	.0052	12.50	.668	.0748	-.0051	-.0092	.0083	.0036
14.56	.753	.0969	.0033	-.0130	.0173	.0044	14.59	.793	.0968	-.0076	-.0072	.0065	.0033
16.65	.872	.1234	.0005	-.0155	.0169	.0044	16.68	.922	.1276	-.0158	-.0103	.0026	.0047
18.75	1.024	.2085	-.0318	-.0065	.0060	.0006	18.75	1.026	.2069	-.0303	-.0039	.0054	-.0004
20.77	1.049	.2963	-.0186	-.0013	.0008	-.0013	20.77	1.047	.2947	-.0168	-.0003	.0014	-.0005

NACA

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3  
(a)  $x_g/c = 0.70$ ;  $h/c = 0$  and  $0.05$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.03	-0.103	0.0127	0.0233	0.0001	0.0019	0.0001
.04	-.002	.0109	.0138	-.0004	.0022	.0004
2.11	.099	.0123	.0013	-.0008	.0016	.0004
4.18	.198	.0163	-.0071	-.0016	.0021	.0005
6.25	.300	.0237	-.0193	-.0029	.0021	.0013
8.32	.403	.0368	-.0294	-.0013	.0015	.0003
10.39	.497	.0576	-.0422	-.0013	.0020	.0002
12.46	.602	.0910	-.0492	.0001	.0015	-.0004
14.53	.702	.1358	-.0570	.0001	.0015	-.0007
16.59	.792	.1906	-.0645	-.0018	.0015	.0001
18.66	.881	.2532	-.0690	-.0014	.0010	.0001
20.71	.958	.3208	-.0834	-.0011	.0021	-.0006

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.03	-0.099	0.0150	0.0189	0.0024	0.0025	-0.0012
.04	.004	.0137	.0082	.0020	.0015	-.0012
2.11	.107	.0132	-.0051	.0008	.0022	-.0005
4.18	.204	.0195	-.0160	.0008	.0022	-.0007
6.25	.298	.0271	-.0268	-.0009	.0021	-.0001
8.32	.402	.0404	-.0361	.0009	.0015	-.0004
10.39	.497	.0608	-.0473	-.0004	.0019	-.0005
12.46	.600	.0944	-.0575	-.0010	.0022	-.0006
14.53	.704	.1394	-.0655	.0005	.0023	-.0010
16.60	.800	.1942	-.0719	-.0001	.0009	-.0006
18.66	.883	.2574	-.0771	.0001	-.0004	.0006
20.72	.974	.3264	-.0846	.0008	.0002	.0001

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.04	-0.112	0.0217	0.0122	0.0040	0.0014	-0.0014
.03	-.017	.0203	.0026	.0025	.0030	-.0004
2.10	.086	.0218	-.0052	.0013	.0030	.0001
4.16	.176	.0253	-.0170	-.0006	.0039	.0008
6.23	.273	.0327	-.0294	-.0010	.0040	.0005
8.30	.374	.0450	-.0381	-.0023	.0044	.0010
10.37	.465	.0633	-.0465	-.0016	.0049	.0001
12.44	.566	.0942	-.0557	-.0003	.0046	-.0008
14.51	.676	.1373	-.0630	.0022	.0025	-.0013
16.58	.767	.1890	-.0698	.0017	.0013	-.0012
18.64	.863	.2557	-.0771	.0010	.0016	-.0011
20.71	.956	.3271	-.0862	0	.0052	-.0025

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.05	-0.127	0.0277	0.0179	0.0009	0.0052	0.0013
.02	-.031	.0260	.0076	-.0010	.0072	.0021
2.08	.064	.0266	-.0006	-.0018	.0073	.0020
4.15	.156	.0297	-.0110	-.0026	.0085	.0021
6.22	.259	.0359	-.0229	-.0044	.0084	.0024
8.29	.352	.0472	-.0314	-.0046	.0099	.0017
10.35	.449	.0642	-.0405	-.0026	.0087	0
12.43	.552	.0937	-.0498	.0010	.0076	-.0015
14.50	.652	.1358	-.0591	.0019	.0063	-.0025
16.57	.753	.1893	-.0631	.0007	.0073	-.0031
18.64	.851	.2552	-.0736	.0004	.0053	-.0028
20.70	.946	.3255	-.0829	.0022	.0056	-.0042

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.06	-0.147	0.0316	0.0239	0.0003	0.0112	0.0026
0	-.054	.0293	.0188	-.0003	.0126	.0026
2.07	.036	.0299	.0102	-.0038	.0144	.0036
4.14	.138	.0322	.0002	-.0048	.0164	.0035
6.20	.231	.0378	-.0104	-.0071	.0170	.0033
8.27	.334	.0486	-.0215	-.0056	.0147	.0019
10.34	.428	.0642	-.0313	-.0042	.0136	.0007
12.42	.536	.0935	-.0446	-.0017	.0117	-.0010
14.49	.649	.1365	-.0544	.0007	.0087	-.0022
16.56	.748	.1876	-.0632	-.0001	.0068	-.0029
18.64	.855	.2559	-.0748	.0007	.0041	-.0032
20.70	.948	.3267	-.0859	.0022	.0052	-.0031

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
-2.06	-0.137	0.0296	0.0252	-0.0013	0.0096	0.0030
.01	-.040	.0278	.0182	-.0039	.0116	.0042
2.07	.049	.0284	.0105	-.0044	.0131	.0035
4.14	.148	.0316	.0015	-.0060	.0153	.0037
6.21	.244	.0373	-.0108	-.0081	.0152	.0038
8.28	.346	.0476	-.0211	-.0092	.0156	.0029
10.35	.445	.0643	-.0317	-.0055	.0135	.0007
12.43	.555	.0954	-.0453	-.0044	.0111	-.0002
14.51	.667	.1391	-.0556	.0011	.0069	-.0022
16.58	.774	.1948	-.0673	-.0025	.0056	-.0013
18.65	.876	.2610	-.0732	-.0025	.0057	-.0021
20.71	.953	.3266	-.0798	-.0011	.0047	-.0022

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (b)  $x_B/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$
$h/c = 0.05 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.05 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.04	-0.113	0.0222	0.0266	-0.0026	0.0062	0.0033	-2.04	-0.112	0.0172	0.0267	-0.0012	0.0035	0.0017
.03	-.020	.0206	.0181	-.0038	.0073	.0038	.03	-.015	.0154	.0181	-.0019	.0050	.0020
2.09	.076	.0217	.0079	-.0045	.0083	.0040	2.10	.085	.0167	.0080	-.0013	.0043	.0018
4.16	.175	.0251	-.0021	-.0059	.0103	.0037	4.17	.186	.0199	-.0018	-.0045	.0068	.0029
6.24	.279	.0317	-.0138	-.0069	.0108	.0033	6.24	.285	.0267	-.0129	-.0056	.0067	.0032
8.30	.373	.0434	-.0244	-.0064	.0105	.0025	8.31	.385	.0394	-.0241	-.0041	.0059	.0019
10.37	.476	.0627	-.0374	-.0031	.0083	.0008	10.38	.492	.0602	-.0391	-.0010	.0034	.0010
12.45	.589	.0960	-.0497	-.0030	.0057	.0007	12.46	.598	.0921	-.0473	-.0025	.0029	.0007
14.53	.704	.1410	-.0567	-.0014	.0044	-.0003	14.53	.696	.1349	-.0550	-.0005	.0030	-.0004
16.59	.779	.1911	-.0617	-.0030	.0043	-.0003	16.59	.791	.1907	-.0659	-.0008	.0020	-.0010
18.66	.882	.2548	-.0686	-.0029	.0042	-.0017	18.66	.881	.2538	-.0694	-.0009	-.0009	.0007
20.71	.949	.3210	-.0823	.0012	.0026	-.0024	20.71	.957	.3182	-.0791	-.0013	.0003	.0005
$h/c = 0.05 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$							$h/c = 0.05 \quad \eta_1 = 0.20 \quad \eta_0 = 0.40$						
-2.04	-0.111	0.0137	0.0269	-0.0005	0.0017	0.0010	-2.02	-0.092	0.0203	0.0094	0.0040	0.0003	-0.0025
.04	-.007	.0120	.0169	-.0013	.0031	.0016	.05	.009	.0192	.0008	.0013	.0020	-.0005
2.11	.094	.0132	.0061	-.0013	.0036	.0010	2.11	.106	.0208	-.0107	.0012	.0016	-.0008
4.17	.189	.0167	-.0049	-.0017	.0037	.0013	4.19	.209	.0249	-.0201	.0001	.0029	-.0004
6.25	.294	.0238	-.0174	-.0032	.0033	.0017	6.25	.300	.0327	-.0314	-.0009	.0026	.0001
8.32	.395	.0368	-.0280	-.0009	.0024	.0006	8.32	.393	.0453	-.0389	-.0025	.0038	.0003
10.39	.499	.0568	-.0390	-.0005	.0025	-.0004	10.38	.491	.0647	-.0498	-.0004	.0031	-.0005
12.46	.598	.0896	-.0481	-.0003	.0022	-.0003	12.46	.599	.0981	-.0582	-.0011	.0030	-.0009
14.53	.700	.1351	-.0561	.0001	.0014	-.0005	14.53	.696	.1410	-.0667	.0011	.0016	-.0012
16.60	.794	.1906	-.0638	-.0011	.0006	-.0002	16.59	.784	.1937	-.0736	-.0007	.0012	-.0010
18.66	.885	.2553	-.0709	-.0018	.0001	.0010	18.66	.880	.2597	-.0749	-.0008	.0024	-.0012
20.71	.953	.3194	-.0821	-.0007	.0027	-.0005	20.71	.939	.3232	-.0806	-.0014	.0038	-.0017
$h/c = 0.05 \quad \eta_1 = 0.40 \quad \eta_0 = 0.60$							$h/c = 0.05 \quad \eta_1 = 0.40 \quad \eta_0 = 0.80$						
-2.03	-0.097	0.0183	0.0170	-0.0013	0.0017	0.0013	-2.05	-0.122	0.0217	0.0244	-0.0014	0.0049	0.0017
0	.003	.0169	.0089	-.0012	.0013	.0013	.02	-.029	.0199	.0162	-.0031	.0055	.0029
4.18	.198	.0225	-.0120	-.0025	.0036	.0014	2.09	.072	.0209	.0081	-.0040	.0067	.0029
6.25	.296	.0298	-.0245	-.0038	.0038	.0017	4.16	.168	.0243	-.0045	-.0046	.0069	.0034
8.32	.393	.0420	-.0331	-.0042	.0048	.0015	6.23	.267	.0307	-.0152	-.0055	.0074	.0027
10.39	.491	.0619	-.0433	-.0026	.0042	.0005	8.30	.369	.0424	-.0247	-.0060	.0082	.0029
12.45	.594	.0942	-.0525	-.0021	.0037	.0003	10.37	.468	.0613	-.0363	-.0041	.0075	.0015
14.53	.697	.1399	-.0585	-.0003	.0026	0	12.45	.579	.0938	-.0481	-.0030	.0059	.0004
16.59	.785	.1921	-.0611	-.0022	.0047	-.0014	14.52	.690	.1393	-.0585	-.0013	.0040	-.0001
18.65	.878	.2545	-.0669	-.0010	.0028	-.0018	16.59	.780	.1905	-.0609	-.0029	.0054	-.0012
20.70	.947	.3196	-.0813	-.0004	.0018	-.0017	18.65	.871	.2526	-.0691	-.0004	.0031	-.0016
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.20$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$						
-2.03	-0.096	0.0191	0.0160	0.0040	0.0013	-0.0030	-2.06	-0.139	0.0344	0.0293	-0.0014	0.0053	0.0022
.04	.006	.0176	.0036	.0040	.0017	-.0028	0	-.064	.0322	.0145	-.0008	.0075	.0018
2.11	.104	.0191	-.0061	.0017	.0025	-.0016	2.07	.036	.0330	.0039	-.0016	.0080	.0014
4.18	.203	.0233	-.0181	-.0006	.0027	-.0006	4.13	.132	.0362	-.0077	-.0027	.0099	.0010
6.24	.293	.0309	-.0288	.0005	.0019	-.0011	6.19	.223	.0422	-.0198	-.0038	.0108	.0011
8.31	.391	.0439	-.0408	-.0006	.0028	-.0008	8.27	.324	.0539	-.0296	-.0050	.0115	.0009
10.38	.489	.0640	-.0499	-.0014	.0022	-.0003	10.33	.408	.0691	-.0362	-.0043	.0129	-.0009
12.45	.591	.0960	-.0575	-.0008	.0026	-.0012	12.37	.477	.0855	-.0442	-.0013	.0107	-.0024
14.53	.698	.1407	-.0642	.0003	.0004	-.0009	14.48	.623	.1392	-.0569	.0021	.0080	-.0051
16.60	.794	.1959	-.0752	.0026	.0018	-.0004	16.54	.722	.1892	-.0660	.0011	.0083	-.0049
18.66	.884	.2596	-.0799	-.0018	-.0016	.0007	18.61	.816	.2496	-.0683	.0051	.0086	-.0073
20.72	.967	.3279	-.0906	-.0029	-.0024	.0022	20.68	.922	.3273	-.0781	.0034	.0074	-.0082

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (c)  $x_B/c = 0.70$ ;  $h/c = 0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_i$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$							$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 0.80$						
-2.09	-0.180	0.0428	0.0300	-0.0016	0.0096	0.0042	-2.10	-0.206	0.0492	0.0372	-0.0051	0.0167	0.0079
-.02	-.092	.0402	.0211	-.0024	.0115	.0040	-.04	-.113	.0457	.0280	-.0048	.0186	.0066
2.04	.002	.0393	.0103	-.0041	.0138	.0039	2.02	-.024	.0446	.0199	-.0054	.0194	.0059
4.11	.104	.0428	.0015	-.0032	.0150	.0021	4.09	.071	.0463	.0101	-.0084	.0227	.0057
6.18	.194	.0462	-.0103	-.0066	.0165	.0030	6.16	.169	.0509	-.0017	-.0092	.0236	.0046
8.25	.296	.0565	-.0185	-.0070	.0169	.0019	8.23	.271	.0581	-.0106	-.0103	.0241	.0030
10.31	.388	.0733	-.0294	-.0057	.0180	-.0012	10.30	.370	.0759	-.0248	-.0076	.0241	-.0012
12.38	.491	.1005	-.0419	-.0012	.0159	-.0041	12.37	.477	.1018	-.0364	-.0030	.0216	-.0033
14.46	.595	.1401	-.0493	.0014	.0138	-.0059	14.45	.583	.1383	-.0435	.0034	.0189	-.0079
16.52	.685	.1877	-.0552	.0023	.0165	-.0076	16.52	.682	.1885	-.0556	.0022	.0178	-.0084
18.60	.798	.2516	-.0605	.0047	.0146	-.0099	18.60	.796	.2536	-.0637	.0035	.0142	-.0088
20.66	.885	.3182	-.0736	.0037	.0134	-.0098	20.66	.880	.3172	-.0742	.0031	.0134	-.0086
$h/c = 0.10 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.20 \quad \eta_0 = 1.00$						
-2.10	-0.206	0.0511	0.0368	-0.0053	0.0187	0.0085	-2.10	-0.197	0.0478	0.0416	-0.0075	0.0180	0.0100
-.04	-.121	.0474	.0326	-.0058	.0208	.0077	-.04	-.111	.0439	.0351	-.0085	.0205	.0093
2.02	-.023	.0471	.0237	-.0080	.0234	.0072	2.03	-.018	.0435	.0272	-.0107	.0227	.0091
4.09	.068	.0474	.0162	-.0096	.0272	.0063	4.09	.073	.0459	.0168	-.0116	.0251	.0084
6.16	.165	.0520	.0040	-.0089	.0269	.0046	6.16	.169	.0487	.0085	-.0138	.0260	.0073
8.23	.265	.0601	-.0071	-.0089	.0265	.0028	8.23	.278	.0569	-.0026	-.0129	.0260	.0054
10.30	.366	.0761	-.0198	-.0070	.0257	-.0005	10.31	.383	.0718	-.0163	-.0111	.0239	.0027
12.37	.471	.1020	-.0346	-.0042	.0224	-.0032	12.38	.479	.0971	-.0289	-.0076	.0223	-.0004
14.48	.576	.1383	-.0442	.0001	.0172	-.0057	14.45	.581	.1341	-.0384	-.0038	.0195	-.0031
16.52	.681	.1882	-.0529	.0027	.0187	-.0082	16.52	.690	.1861	-.0491	-.0031	.0175	-.0040
18.59	.789	.2500	-.0598	.0045	.0134	-.0094	18.61	.811	.2517	-.0596	-.0029	.0127	-.0046
20.66	.890	.3172	-.0699	.0013	.0140	-.0084	20.68	.909	.3191	-.0731	-.0018	.0110	-.0046
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.07	-0.159	0.0325	0.0411	-0.0069	0.0121	0.0081	-2.05	-0.133	0.0214	0.0321	-0.0027	0.0078	0.0045
0	-.063	.0298	.0313	-.0083	.0147	.0085	0	-.029	.0195	.0261	-.0043	.0093	.0050
2.06	.028	.0301	.0240	-.0098	.0169	.0080	2.09	.065	.0202	.0173	-.0058	.0107	.0053
4.13	.126	.0331	.0152	-.0127	.0185	.0088	4.15	.161	.0233	.0041	-.0058	.0118	.0046
6.19	.220	.0377	.0042	-.0120	.0202	.0069	6.22	.256	.0295	-.0058	-.0069	.0107	.0047
8.27	.327	.0483	-.0098	-.0136	.0193	.0064	8.29	.358	.0405	-.0162	-.0081	.0120	.0041
10.34	.426	.0636	-.0172	-.0105	.0184	.0038	10.36	.464	.0594	-.0284	-.0045	.0100	.0024
12.41	.535	.0934	-.0307	-.0093	.0165	.0023	12.45	.587	.0918	-.0457	-.0018	.0047	.0008
14.50	.662	.1404	-.0481	-.0051	.0119	.0005	14.53	.700	.1353	-.0597	.0007	.0018	-.0007
16.58	.774	.1941	-.0622	-.0038	.0060	-.0011	16.59	.786	.1886	-.0641	-.0005	.0027	-.0012
18.65	.868	.2531	-.0691	-.0015	.0044	-.0016	18.65	.878	.2526	-.0697	-.0020	.0001	.0009
20.70	.950	.3185	-.0778	.0001	.0018	-.0007	20.71	.957	.3212	-.0824	-.0022	.0006	.0010
$h/c = 0.10 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.20 \quad \eta_0 = 0.40$						
-2.04	-0.113	0.0131	0.0289	-0.0017	0.0043	0.0023	-2.07	-0.155	0.0301	0.0252	-0.0043	0.0060	0.0045
.03	-.014	.0130	.0201	-.0008	.0057	.0013	0	-.064	.0277	.0174	-.0055	.0072	.0047
2.10	.084	.0144	.0127	-.0029	.0055	.0021	2.06	0.032	.0285	.0079	-.0049	.0077	.0039
4.17	.184	.0180	-.0012	-.0027	.0058	.0016	4.13	.133	.0314	-.0026	-.0069	.0105	.0041
6.25	.283	.0245	-.0125	-.0033	.0054	.0016	6.20	.225	.0375	-.0138	-.0064	.0107	.0028
8.31	.391	.0370	-.0261	-.0024	.0046	.0009	8.27	.330	.0486	-.0257	-.0073	.0110	.0025
10.39	.491	.0566	-.0400	0	.0026	-.0002	10.34	.425	.0650	-.0318	-.0065	.0109	.0015
12.46	.601	.0907	-.0473	0	.0016	-.0002	12.41	.532	.0957	-.0459	-.0028	.0093	-.0006
14.53	.701	.1354	-.0565	.0021	.0007	-.0005	14.48	.628	.1354	-.0506	.0008	.0073	-.0021
16.59	.791	.1915	-.0628	-.0016	.0011	0	16.56	.738	.1885	-.0597	.0011	.0054	-.0033
18.66	.889	.2547	-.0689	-.0014	.0015	-.0006	18.62	.830	.2521	-.0669	-.0008	.0044	-.0024
20.71	.954	.3197	-.0837	.0013	-.0001	-.0003	20.68	.917	.3217	-.0785	-.0005	.0077	-.0043

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Continued  
 (d)  $x_B/c = 0.70$ ;  $h/c = 0.10$  and  $0.15$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 0.60$							$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 0.80$						
-2.06	-0.136	0.0253	0.0300	-0.0061	0.0065	0.0057	-2.07	-0.156	0.0305	0.0353	-0.0063	0.0100	0.0067
.01	-.045	.0234	.0222	-.0051	.0074	.0046	0	-.055	.0277	.0259	-.0082	.0129	.0074
2.08	.051	.0241	.0127	-.0072	.0089	.0049	2.06	.033	.0282	.0181	-.0096	.0143	.0077
4.15	.153	.0277	.0018	-.0087	.0101	.0054	4.13	.135	.0311	.0100	-.0111	.0160	.0074
6.21	.248	.0338	-.0086	-.0091	.0107	.0049	6.20	.231	.0367	-.0009	-.0113	.0164	.0061
8.28	.345	.0448	-.0199	-.0097	.0116	.0041	8.27	.330	.0469	-.0118	-.0145	.0179	.0060
10.35	.444	.0624	-.0295	-.0084	.0114	.0028	10.34	.432	.0635	-.0219	-.0095	.0160	.0032
12.42	.549	.0914	-.0382	-.0071	.0101	.0012	12.42	.537	.0930	-.0339	-.0078	.0153	.0016
14.50	.658	.1378	-.0479	-.0061	.0096	.0016	14.50	.660	.1389	-.0483	-.0060	.0121	.0005
16.58	.770	.1915	-.0616	-.0044	.0065	-.0006	16.58	.778	.1930	-.0618	-.0047	.0079	-.0012
18.64	.863	.2504	-.0681	-.0034	.0036	-.0007	18.65	.871	.2517	-.0679	-.0023	.0053	-.0015
20.70	.946	.3191	-.0821	.0005	.0036	-.0028	20.70	.946	.3175	-.0816	-.0001	.0031	-.0016
$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.20$							$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.40$						
-2.04	-0.113	0.0222	0.0162	0.0018	0.0018	-0.0018	-2.10	-0.194	0.0458	0.0306	-0.0001	0.0081	0.0020
.04	-.001	.0210	.0050	.0017	.0015	-.0016	-.03	-.094	.0437	.0186	-.0008	.0096	.0014
2.10	.091	.0226	-.0050	-.0004	.0016	-.0006	2.04	0	.0451	.0072	-.0035	.0121	.0017
4.17	.186	.0270	-.0136	-.0008	.0018	-.0007	4.11	.095	.0475	-.0028	-.0046	.0146	.0007
6.24	.286	.0343	-.0245	-.0027	.0023	.0003	6.17	.189	.0531	-.0152	-.0060	.0151	.0004
8.31	.381	.0465	-.0346	-.0041	.0039	.0007	8.24	.289	.0632	-.0268	-.0047	.0157	-.0017
10.37	.478	.0659	-.0445	-.0037	.0035	-.0001	10.31	.382	.0804	-.0358	-.0026	.0146	-.0041
12.45	.582	.0974	-.0538	-.0027	.0030	-.0007	12.38	.484	.1069	-.0452	.0006	.0148	-.0076
14.52	.684	.1412	-.0617	-.0018	.0029	-.0006	14.45	.582	.1451	-.0556	.0030	.0125	-.0090
16.59	.783	.1955	-.0692	-.0027	.0021	-.0004	16.52	.690	.1941	-.0648	.0048	.0099	-.0102
18.65	.876	.2615	-.0800	-.0029	-.0010	.0006	18.58	.777	.2510	-.0651	.0056	.0074	-.0108
20.71	.964	.3288	-.0859	-.0030	-.0034	.0026	20.65	.871	.3215	-.0731	.0070	.0099	-.0116
$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.60$							$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 0.80$						
-2.12	-0.225	0.0603	0.0354	-0.0030	0.0172	0.0052	-2.13	-0.243	0.0673	0.0469	-0.0046	0.0218	0.0079
-.05	-.131	.0555	.0320	-.0029	.0175	.0046	-.06	-.149	.0641	.0368	-.0057	.0244	.0076
2.01	-.036	.0562	.0208	-.0034	.0186	.0031	2.00	-.057	.0620	.0266	-.0058	.0255	.0058
4.08	.050	.0579	.0098	-.0044	.0214	.0016	4.06	.032	.0613	.0197	-.0074	.0269	.0046
6.15	.156	.0619	-.0013	-.0056	.0232	.0009	6.13	.133	.0661	.0065	-.0078	.0291	.0025
8.21	.243	.0723	-.0150	-.0087	.0257	-.0006	8.20	.234	.0728	-.0012	-.0089	.0310	-.0005
10.28	.341	.0894	-.0228	-.0090	.0270	-.0022	10.27	.326	.0907	-.0171	-.0091	.0300	-.0029
12.34	.426	.1115	-.0266	-.0040	.0259	-.0079	12.33	.421	.1130	-.0254	-.0060	.0311	-.0071
14.42	.538	.1486	-.0414	.0016	.0250	-.0103	14.41	.535	.1471	-.0369	.0005	.0264	-.0109
16.48	.631	.1931	-.0476	.0026	.0227	-.0127	16.49	.636	.1968	-.0497	.0049	.0223	-.0132
18.56	.741	.2519	-.0530	.0061	.0184	-.0145	18.57	.750	.2542	-.0515	.0056	.0227	-.0153
20.62	.828	.3130	-.0639	.0067	.0171	-.0155	20.63	.841	.3152	-.0610	.0072	.0178	-.0163
$h/c = 0.15 \quad \eta_1 = 0.15 \quad \eta_0 = 1.00$							$h/c = 0.15 \quad \eta_1 = 0.20 \quad \eta_0 = 1.00$						
-2.14	-0.253	0.0714	0.0504	-0.0059	0.0248	0.0103	-2.13	-0.238	0.0671	0.0550	-0.0119	0.0229	0.0142
-.07	-.158	.0633	.0437	-.0064	.0280	.0088	-.07	-.152	.0615	.0484	-.0137	.0267	.0139
1.99	-.067	.0645	.0339	-.0056	.0307	.0060	2.00	-.064	.0598	.0410	-.0124	.0285	.0117
4.06	.024	.0653	.0270	-.0076	.0316	.0054	4.06	.026	.0612	.0297	-.0139	.0311	.0101
6.12	.116	.0681	.0149	-.0118	.0329	.0053	6.13	.127	.0654	.0176	-.0146	.0327	.0082
8.19	.215	.0771	.0019	-.0113	.0360	.0014	8.20	.226	.0734	.0044	-.0147	.0333	.0057
10.26	.320	.0923	-.0101	-.0115	.0345	-.0010	10.27	.330	.0866	-.0053	-.0144	.0325	.0025
12.33	.417	.1125	-.0170	-.0048	.0343	-.0074	12.34	.431	.1074	-.0147	-.0069	.0324	-.0030
14.41	.527	.1493	-.0384	.0007	.0255	-.0104	14.41	.533	.1402	-.0232	-.0030	.0269	-.0060
16.48	.632	.1968	-.0441	.0013	.0266	-.0124	16.49	.642	.1897	-.0339	-.0022	.0250	-.0074
18.55	.732	.2525	-.0494	.0047	.0210	-.0145	18.57	.753	.2476	-.0402	.0019	.0195	-.0098
20.63	.839	.3157	-.0567	.0066	.0175	-.0162	20.65	.872	.3169	-.0644	-.0018	.0177	-.0094

TABLE XI.- AERODYNAMIC CHARACTERISTICS OF MODEL 3 - Concluded  
(e)  $x_E/c = 0.70$ ;  $h/c = 0.15$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_Z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_Z$	$C_n$
$h/c = 0.15 \quad \eta_i = 0.40 \quad \eta_o = 1.00$							$h/c = 0.15 \quad \eta_i = 0.60 \quad \eta_o = 1.00$						
-2.09	-0.181	0.0436	0.0495	-0.0115	0.0168	0.0121	-2.06	-0.136	0.0266	0.0373	-0.0051	0.0098	0.0067
-.03	-.096	.0396	.0436	-.0125	.0203	.0122	.01	-.045	.0239	.0324	-.0057	.0129	.0066
2.04	-.007	.0394	.0353	-.0163	.0233	.0132	2.07	.047	.0242	.0244	-.0079	.0142	.0071
4.10	.084	.0413	.0270	-.0165	.0254	.0120	4.14	.147	.0272	.0145	-.0096	.0162	.0073
6.17	.186	.0466	.0161	-.0184	.0266	.0111	6.21	.246	.0334	.0014	-.0100	.0152	.0067
8.24	.290	.0550	.0060	-.0182	.0265	.0089	8.28	.345	.0437	-.0079	-.0103	.0158	.0055
10.31	.388	.0697	-.0055	-.0170	.0266	.0062	10.35	.448	.0609	-.0182	-.0074	.0154	.0032
12.39	.501	.0967	-.0181	-.0096	.0226	.0022	12.45	.584	.0932	-.0424	-.0040	.0063	.0013
14.47	.608	.1364	-.0301	-.0086	.0201	.0012	14.53	.700	.1356	-.0550	0	.0019	-.0015
16.58	.770	.1936	-.0573	-.0054	.0090	-.0013	16.60	.797	.1896	-.0613	-.0019	.0010	-.0009
18.65	.867	.2508	-.0662	-.0008	.0041	-.0013	18.66	.874	.2516	-.0704	-.0003	.0027	-.0012
20.71	.962	.3228	-.0820	-.0001	.0014	-.0010	20.71	.963	.3208	-.0799	.0004	.0016	-.0015
$h/c = 0.15 \quad \eta_i = 0.80 \quad \eta_o = 1.00$							$h/c = 0.15 \quad \eta_i = 0.20 \quad \eta_o = 0.40$						
-2.04	-0.109	0.0163	0.0296	-0.0007	0.0043	0.0017	-2.09	-0.184	0.0382	0.0318	-0.0058	0.0096	0.0059
.03	-.011	.0146	.0189	-.0012	.0054	.0020	-.02	-.090	.0360	.0251	-.0075	.0097	.0061
2.10	.086	.0156	.0089	-.0015	.0062	.0019	2.04	.006	.0365	.0153	-.0067	.0122	.0048
4.17	.186	.0192	-.0016	-.0030	.0069	.0022	4.11	.100	.0391	.0037	-.0070	.0131	.0041
6.24	.281	.0259	-.0123	-.0029	.0065	.0017	6.18	.198	.0455	-.0076	-.0080	.0139	.0032
8.32	.394	.0385	-.0273	-.0025	.0043	.0010	8.25	.295	.0552	-.0188	-.0066	.0142	.0015
10.39	.503	.0583	-.0430	-.0017	.0014	.0003	10.32	.395	.0724	-.0300	-.0047	.0145	-.0002
12.46	.605	.0919	-.0505	-.0003	.0009	-.0005	12.39	.496	.0995	-.0395	-.0043	.0142	-.0024
14.54	.710	.1370	-.0570	.0008	.0032	-.0004	14.46	.598	.1384	-.0455	.0012	.0108	-.0049
16.60	.793	.1908	-.0653	-.0018	.0031	.0002	16.53	.704	.1873	-.0514	.0018	.0096	-.0055
18.66	.887	.2534	-.0683	-.0003	0	-.0005	18.60	.796	.2475	-.0576	.0016	.0093	-.0054
20.72	.967	.3214	-.0792	-.0003	0	0	20.66	.886	.3201	-.0697	.0001	.0117	-.0065
$h/c = 0.15 \quad \eta_i = 0.40 \quad \eta_o = 0.60$							$h/c = 0.15 \quad \eta_i = 0.40 \quad \eta_o = 0.80$						
-2.08	-0.166	0.0317	0.0379	-0.0078	0.0108	0.0077	-2.09	-0.183	0.0407	0.0467	-0.0113	0.0152	0.0117
-.01	-.072	.0292	.0317	-.0095	.0119	.0079	-.03	-.095	.0368	.0386	-.0134	.0178	.0122
2.05	.021	.0294	.0232	-.0116	.0136	.0081	2.04	-.003	.0369	.0309	-.0141	.0205	.0114
4.12	.111	.0326	.0134	-.0113	.0115	.0072	4.10	.092	.0390	.0215	-.0141	.0212	.0103
6.19	.211	.0382	.0040	-.0142	.0168	.0078	6.17	.190	.0438	.0104	-.0179	.0239	.0102
8.26	.319	.0493	-.0078	-.0134	.0173	.0060	8.24	.292	.0536	.0014	-.0174	.0231	.0088
10.33	.410	.0663	-.0183	-.0134	.0180	.0048	10.31	.390	.0696	-.0109	-.0167	.0244	.0067
12.41	.522	.0951	-.0302	-.0086	.0160	.0021	12.38	.488	.0947	-.0227	-.0127	.0227	.0035
14.48	.624	.1362	-.0386	-.0064	.0140	.0013	14.47	.614	.1371	-.0328	-.0094	.0197	.0008
16.57	.756	.1910	-.0587	-.0076	.0090	-.0008	16.58	.766	.1923	-.0598	-.0065	.0085	-.0008
18.65	.869	.2526	-.0678	-.0020	.0062	-.0028	18.65	.870	.2528	-.0684	-.0023	.0061	-.0013
20.70	.946	.3170	-.0794	-.0007	.0034	-.0014	20.70	.941	.3186	-.0825	.0004	.0028	-.0019



TABLE XII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
(a)  $x_g/c = 0.70$ ;  $h/c = 0$  and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.01	-0.088	0.0317	0.0221	0.0037	-0.0009	-0.0007
.07	.055	.0290	.0056	.0038	-.0012	-.0009
2.16	.200	.0299	-.0078	.0038	-.0025	-.0010
4.25	.337	.0346	-.0175	.0036	-.0024	-.0011
6.33	.467	.0422	-.0382	.0043	-.0022	-.0010
8.41	.612	.0534	-.0525	.0038	-.0016	-.0007
10.50	.750	.0687	-.0707	.0049	-.0030	-.0011
12.58	.885	.0872	-.0795	.0038	-.0024	-.0012
14.65	.997	.1377	-.0827	-.0029	.0013	.0015
16.64	.973	.2311	-.0391	.0004	.0019	-.0008

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$						
$\eta_1 = 0.10$						
$\eta_0 = 0.20$						
-2.04	-0.135	0.0408	0.0087	0.0010	0.0038	0.0016
.04	.005	.0380	-.0116	.0011	.0037	.0012
2.13	.139	.0387	-.0258	.0019	.0040	.0008
4.21	.281	.0422	-.0433	.0023	.0033	.0006
6.29	.411	.0494	-.0588	.0026	.0039	.0002
8.38	.551	.0592	-.0763	.0041	.0027	-.0003
10.46	.694	.0734	-.0895	.0047	.0030	-.0006
12.54	.822	.0910	-.1024	.0059	.0022	-.0013
14.61	.934	.1214	-.0966	.0064	.0015	-.0010
15.62	.954	.1857	-.0811	.0056	.0004	-.0022

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$						
$\eta_1 = 0.10$						
$\eta_0 = 0.40$						
-2.09	-0.218	0.0556	0.0048	-0.0020	0.0135	0.0040
-.01	-.075	.0518	-.0133	0	.0150	.0033
2.08	.058	.0505	-.0288	0	.0159	.0025
4.16	.189	.0531	-.0440	.0010	.0153	.0017
6.24	.329	.0584	-.0566	.0019	.0157	.0008
8.33	.472	.0669	-.0705	.0010	.0163	.0002
10.41	.603	.0796	-.0886	.0014	.0169	-.0006
12.49	.741	.0963	-.0989	.0007	.0178	-.0011
14.57	.861	.1197	-.1050	-.0013	.0185	-.0013
15.59	.897	.1814	-.0961	.0031	.0138	-.0033

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$						
$\eta_1 = 0.10$						
$\eta_0 = 0.60$						
-2.12	-0.263	0.0675	0.0293	-0.0021	0.0270	0.0068
-.04	-.131	.0623	.0107	-.0014	.0285	.0056
2.04	.003	.0606	.0011	-.0020	.0291	.0049
4.12	.137	.0623	-.0175	-.0028	.0288	.0037
6.20	.269	.0664	-.0279	-.0030	.0304	.0027
8.29	.415	.0741	-.0471	-.0037	.0298	.0019
10.38	.551	.0848	-.0641	-.0035	.0302	.0003
12.46	.689	.1008	-.0739	-.0043	.0303	-.0004
14.54	.818	.1214	-.0800	-.0054	.0296	-.0004

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$						
$\eta_1 = 0.10$						
$\eta_0 = 1.00$						
-2.15	-0.305	0.0856	0.0645	-0.0050	0.0435	0.0134
-.07	-.180	.0807	.0492	-.0060	.0446	.0123
2.01	-.045	.0787	.0352	-.0078	.0459	.0112
4.09	.087	.0781	.0208	-.0090	.0468	.0100
6.18	.222	.0807	.0048	-.0113	.0490	.0083
8.26	.359	.0857	-.0089	-.0117	.0496	.0069
10.35	.501	.0946	-.0229	-.0133	.0495	.0055
12.44	.646	.1088	-.0410	-.0154	.0486	.0035
14.52	.789	.1268	-.0466	-.0163	.0443	.0021

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10$						
$\eta_1 = 0.20$						
$\eta_0 = 1.00$						
-2.12	-0.263	0.0801	0.0711	-0.0090	0.0393	0.0126
-.04	-.138	.0758	.0591	-.0109	.0414	.0121
2.03	-.009	.0730	.0467	-.0121	.0433	.0109
4.11	.126	.0740	.0373	-.0147	.0445	.0100
6.20	.257	.0770	.0291	-.0165	.0459	.0089
8.28	.390	.0827	.0126	-.0182	.0471	.0072
10.36	.530	.0923	-.0025	-.0200	.0474	.0059
12.45	.671	.1059	-.0197	-.0218	.0464	.0049
14.54	.810	.1250	-.0329	-.0118	.0395	.0038
16.60	.908	.1983	-.0421	.0150	.0073	-.0073

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TABLE XII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4 - Concluded  
(b)  $x_B/c = 0.70$ ;  $h/c = 0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$						
-2.08	-0.195	0.0662	0.0659	-0.0071	0.0257	0.0111
0	-.063	.0628	.0475	-.0086	.0283	.0107
2.09	.082	.0612	.0351	-.0103	.0299	.0101
4.17	.216	.0628	.0219	-.0117	.0308	.0095
6.25	.346	.0675	.0126	-.0137	.0317	.0087
8.34	.483	.0753	-.0013	-.0157	.0337	.0079
10.42	.629	.0869	-.0139	-.0167	.0337	.0071
12.50	.759	.1015	-.0345	-.0189	.0322	.0062
14.59	.903	.1298	-.0393	-.0119	.0267	.0023
15.62	.943	.1733	-.0478	-.0086	.0214	.0050
$h/c = 0.10 \quad \eta_1 = 0.80 \quad \eta_0 = 1.00$						
-2.02	-0.106	0.0422	0.0276	-0.0004	0.0041	0.0046
.06	.036	.0390	.0146	-.0010	.0038	.0042
2.15	.173	.0393	.0037	-.0020	.0055	.0039
4.23	.309	.0427	-.0018	-.0024	.0060	.0036
6.32	.452	.0493	-.0226	-.0032	.0064	.0035
8.40	.584	.0606	-.0422	-.0030	.0066	.0032
10.48	.720	.0746	-.0588	-.0054	.0064	.0033
12.57	.864	.0924	-.0668	-.0059	.0052	.0034
14.65	1.002	.1341	-.0883	.0059	-.0028	-.0013
15.66	1.016	.1802	-.0729	.0168	-.0112	-.0042

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.10 \quad \eta_1 = 0.60 \quad \eta_0 = 1.00$						
-2.05	-0.142	0.0541	0.0443	-0.0040	0.0135	0.0087
.04	-.001	.0508	.0316	-.0058	.0153	.0085
2.12	.138	.0500	.0218	-.0058	.0160	.0078
4.21	.272	.0525	.0117	-.0070	.0177	.0074
6.29	.403	.0577	-.0016	-.0084	.0195	.0067
8.37	.544	.0677	-.0170	-.0090	.0192	.0064
10.46	.685	.0804	-.0317	-.0107	.0195	.0060
12.54	.825	.0969	-.0485	-.0112	.0185	.0053
14.64	.959	.1327	-.0629	-.0052	.0113	.0021
15.65	1.004	.1803	-.0622	.0138	-.0084	-.0038
$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 0.80$						
-2.07	-0.183	0.0575	0.0525	-0.0045	0.0233	0.0074
.01	-.047	.0538	.0393	-.0052	.0244	.0070
2.09	.088	.0532	.0282	-.0070	.0256	.0067
4.18	.224	.0551	.0174	-.0087	.0280	.0062
6.26	.357	.0605	.0072	-.0098	.0285	.0056
8.34	.493	.0695	-.0083	-.0105	.0283	.0051
10.42	.628	.0820	-.0261	-.0139	.0302	.0045
12.51	.771	.0977	-.0401	-.0146	.0281	.0037
14.59	.903	.1224	-.0525	-.0098	.0243	.0021
15.63	.971	.2267	-.0525	.0021	.0019	-.0028

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TABLE XIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
WITH HORIZONTAL TAIL REMOVED  
(a)  $x_B/c = 0.70$ ;  $h/c = 0$  and  $0.05$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0$						
-2.01	-0.078	0.0315	0.0113	0.0024	-0.0004	-0.0005
.08	.060	.0285	.0126	.0024	-.0008	-.0005
2.15	.187	.0293	.0129	.0032	-.0017	-.0006
4.24	.320	.0334	.0134	.0025	-.0015	-.0007
6.32	.452	.0399	.0176	.0022	-.0009	-.0006
8.40	.584	.0495	.0177	.0043	-.0023	-.0006
10.48	.710	.0629	.0166	.0023	-.0016	-.0007
12.55	.827	.0804	.0192	.0032	-.0022	-.0004
14.62	.950	.1151	.0282	-.0092	-.0028	-.0031
16.62	.975	.2269	.0595	.0030	-.0042	-.0001

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
$\eta_1 = 0.10$			$\eta_0 = 0.20$			
-2.02	-0.090	0.0357	0.0029	0.0033	0.0010	-0.0003
.02	.027	.0336	0	.0028	.0007	-.0002
2.14	.164	.0338	.0090	.0020	.0013	-.0002
4.22	.291	.0374	.0059	.0028	.0005	-.0002
6.29	.416	.0436	.0077	.0024	.0020	-.0001
8.38	.554	.0529	.0114	.0037	.0003	-.0002
10.46	.690	.0659	.0099	.0038	.0005	-.0005
12.53	.805	.0817	.0115	.0044	.0003	-.0010
14.60	.921	.1025	.0175	.0020	.0029	-.0011
15.63	.962	.1536	.0197	.0019	.0003	-.0009

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
$\eta_1 = 0.10$			$\eta_0 = 0.40$			
-2.05	-0.143	0.0429	0.0066	0.0025	0.0087	0.0013
.03	-.018	.0402	.0079	.0030	.0084	.0009
2.10	.100	.0401	.0080	.0022	.0078	.0005
4.19	.238	.0425	.0100	.0017	.0089	.0004
6.26	.360	.0476	.0125	.0018	.0100	.0002
8.34	.493	.0561	.0123	.0015	.0093	-.0002
10.42	.626	.0676	.0128	.0013	.0097	-.0005
12.51	.762	.0828	.0135	.0011	.0093	-.0007
14.58	.875	.1065	.0179	.0049	.0114	-.0037
15.60	.917	.1483	.0185	.0080	.0039	-.0034

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
$\eta_1 = 0.10$			$\eta_0 = 0.60$			
-2.07	-0.178	0.0492	0.0096	0.0027	0.0158	0.0024
.01	-.052	.0461	.0015	.0021	.0168	.0021
2.09	.076	.0450	.0179	.0013	.0170	.0019
4.17	.206	.0468	.0184	.0004	.0181	.0014
6.24	.331	.0511	.0213	.0007	.0180	.0012
8.32	.461	.0590	.0213	0	.0172	.0003
10.40	.595	.0697	.0191	-.0011	.0179	0
12.48	.726	.0838	.0164	-.0020	.0181	-.0003
14.56	.846	.1008	.0265	-.0030	.0174	-.0012
15.59	.901	.1398	.0253	.0109	.0095	-.0076

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
$\eta_1 = 0.10$			$\eta_0 = 1.00$			
-2.08	-0.202	0.0584	0.0261	0.0020	0.0265	0.0060
-.01	-.083	.0541	.0273	.0013	.0283	.0055
2.07	.047	.0525	.0344	-.0013	.0290	.0048
4.14	.169	.0536	.0371	-.0026	.0298	.0043
6.22	.300	.0568	.0399	-.0048	.0307	.0037
8.30	.427	.0635	.0403	-.0051	.0296	.0028
10.38	.562	.0731	.0396	-.0079	.0310	.0020
12.40	.694	.0862	.0327	-.0085	.0286	.0012
14.55	.829	.1030	.0361	-.0088	.0261	.0008
15.58	.890	.1408	.0352	.0056	.0135	-.0040

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05$						
$\eta_1 = 0.20$			$\eta_0 = 1.00$			
-2.06	-0.167	0.0565	0.0269	-0.0015	0.0224	0.0060
.02	-.040	.0525	.0315	-.0030	.0236	.0059
2.09	.084	.0516	.0377	-.0077	.0248	.0053
4.17	.213	.0533	.0389	-.0059	.0254	.0048
6.24	.332	.0574	.0436	-.0076	.0266	.0042
8.32	.465	.0649	.0408	-.0086	.0266	.0033
10.41	.597	.0750	.0365	-.0099	.0271	.0028
12.49	.731	.0885	.0379	-.0105	.0248	.0020
14.57	.861	.1051	.0396	-.0109	.0228	.0016
16.60	.922	.2079	.0490	-.0036	.0089	-.0014

TABLE XIII.- AERODYNAMIC CHARACTERISTICS OF MODEL 4  
WITH HORIZONTAL TAIL REMOVED - Concluded  
(b)  $x_B/c = 0.70$ ;  $h/c = 0.05$  and  $0.10$

$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$	$\alpha$	$C_L$	$C_D$	$C_m$	$C_Y$	$C_z$	$C_n$
$h/c = 0.05 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.10 \quad \eta_0 = 0.40$						
-2.04	-0.134	0.0487	0.0237	-0.0014	0.0148	0.0057	-2.09	-0.212	0.0551	0.0060	0.0024	0.0152	0.0029
.03	-.010	.0458	.0289	-.0024	.0165	.0052	-.01	-.088	.0514	.0039	.0029	.0151	.0022
2.12	.126	.0452	.0316	-.0040	.0163	.0048	2.06	.040	.0505	.0088	.0022	.0152	.0016
4.20	.257	.0476	.0381	-.0048	.0165	.0043	4.14	.171	.0525	.0112	.0027	.0156	.0010
6.28	.385	.0528	.0391	-.0056	.0180	.0040	6.23	.305	.0568	.0101	.0024	.0164	.0004
8.35	.511	.0608	.0353	-.0065	.0174	.0034	8.30	.433	.0644	.0101	.0017	.0177	.0002
10.43	.640	.0718	.0382	-.0072	.0184	.0032	10.39	.564	.0756	.0116	.0011	.0175	-.0006
12.51	.771	.0861	.0384	-.0078	.0161	.0023	12.47	.696	.0905	.0070	-.0003	.0184	-.0010
14.59	.904	.1043	.0446	-.0091	.0143	.0024	14.54	.809	.1085	.0136	-.0026	.0203	-.0014
16.61	.933	.2128	.0447	-.0036	.0082	-.0020	16.59	.892	.1828	.0266	.0128	.0017	-.0055
$h/c = 0.10 \quad \eta_1 = 0.10 \quad \eta_0 = 1.00$							$h/c = 0.10 \quad \eta_1 = 0.40 \quad \eta_0 = 1.00$						
-2.15	-0.305	0.0856	0.0452	-0.0034	0.0430	0.0127	-2.07	-0.182	0.0666	0.0395	-0.0076	0.0261	0.0116
-.07	-.184	.0807	.0459	-.0048	.0439	.0118	.01	-.056	.0625	.0436	-.0088	.0284	.0110
2.01	-.057	.0776	.0503	-.0064	.0450	.0108	2.08	.071	.0608	.0483	-.0109	.0297	.0105
4.08	.072	.0771	.0533	-.0090	.0474	.0100	4.17	.205	.0623	.0533	-.0129	.0307	.0099
6.16	.192	.0792	.0574	-.0107	.0483	.0086	6.24	.332	.0656	.0548	-.0147	.0327	.0093
8.24	.329	.0821	.0567	-.0124	.0499	.0070	8.32	.454	.0728	.0550	-.0168	.0339	.0087
10.32	.461	.0904	.0547	-.0146	.0493	.0060	10.40	.591	.0821	.0552	-.0181	.0331	.0076
12.41	.598	.1022	.0500	-.0155	.0470	.0045	12.48	.723	.0952	.0535	-.0208	.0317	.0069
14.48	.720	.1164	.0468	-.0158	.0439	.0034	14.56	.852	.1119	.0551	-.0215	.0289	.0061
16.55	.837	.1842	.0578	.0115	.0166	-.0065	16.62	.948	.2068	.0491	-.0003	.0033	-.0026

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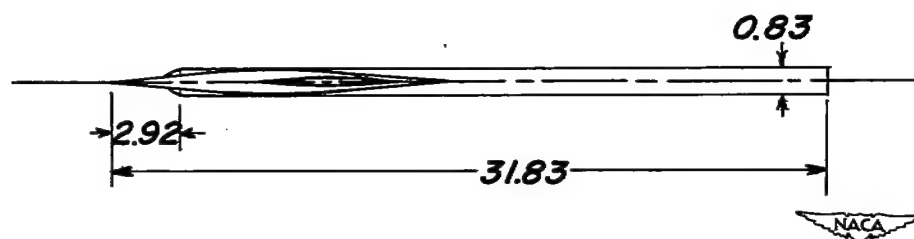
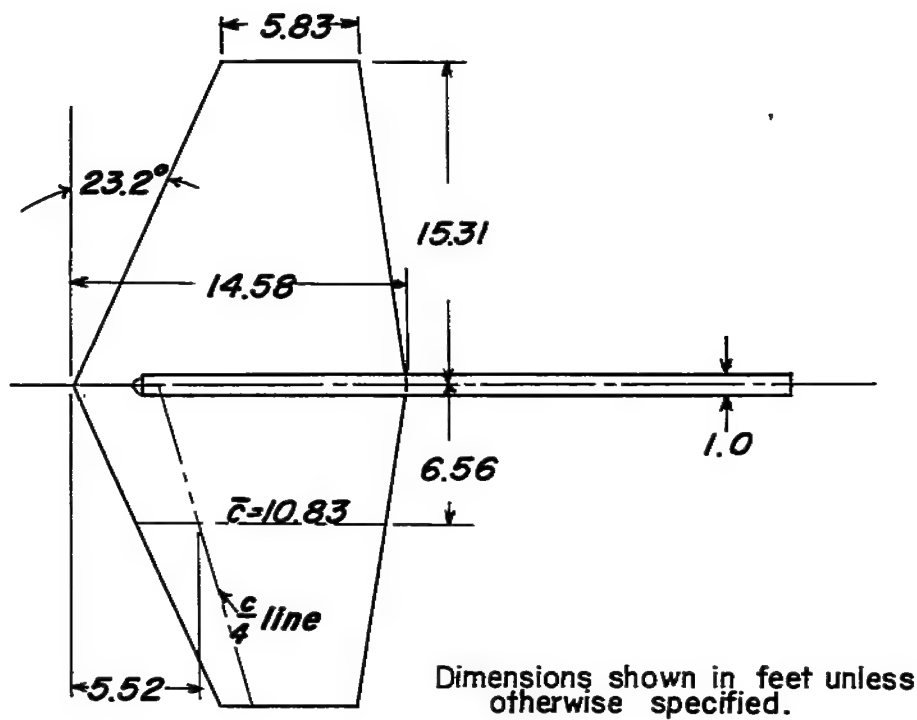


Figure 1.- Geometric details of model 1.

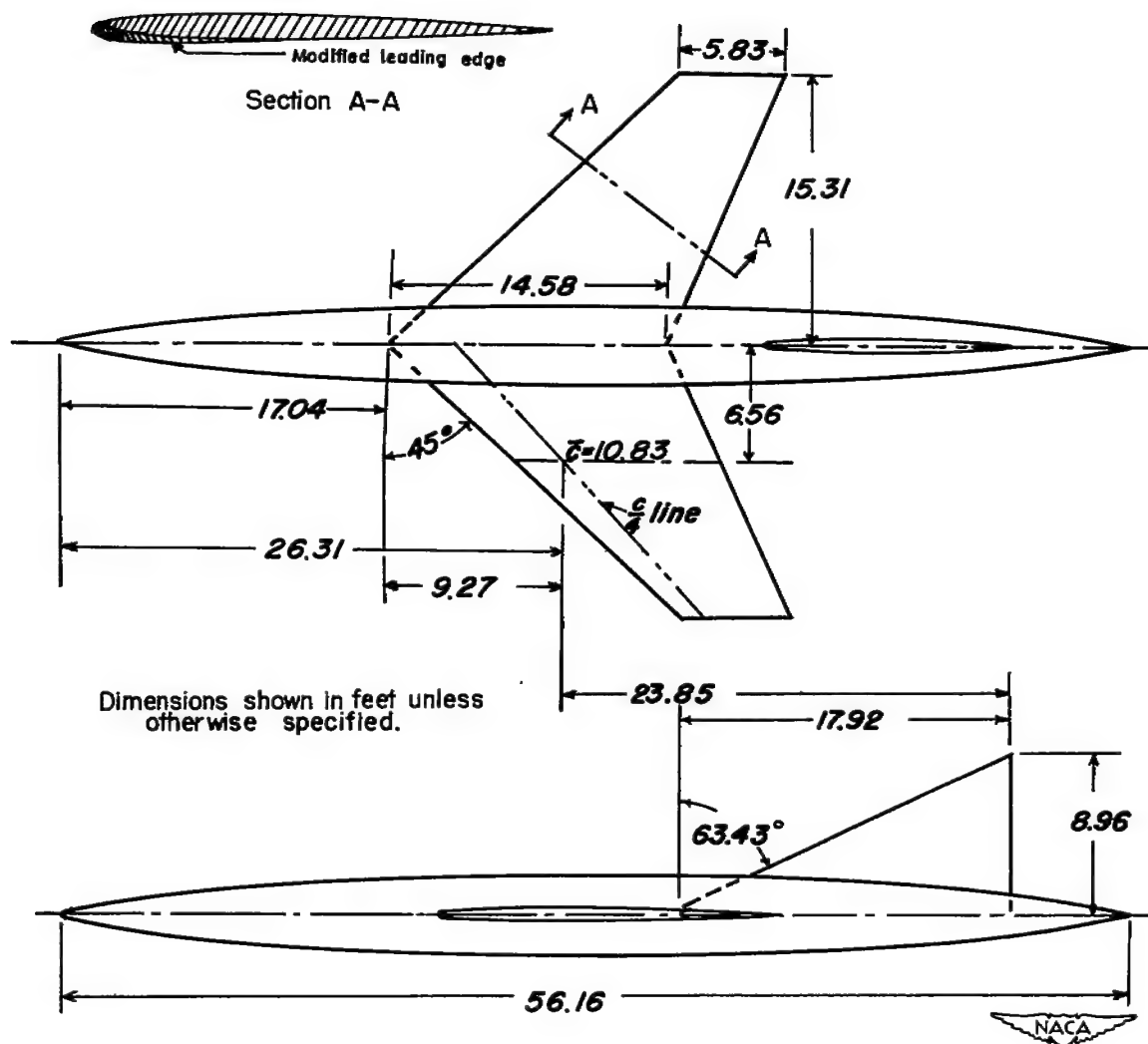


Figure 2.- Geometric details of model 2.

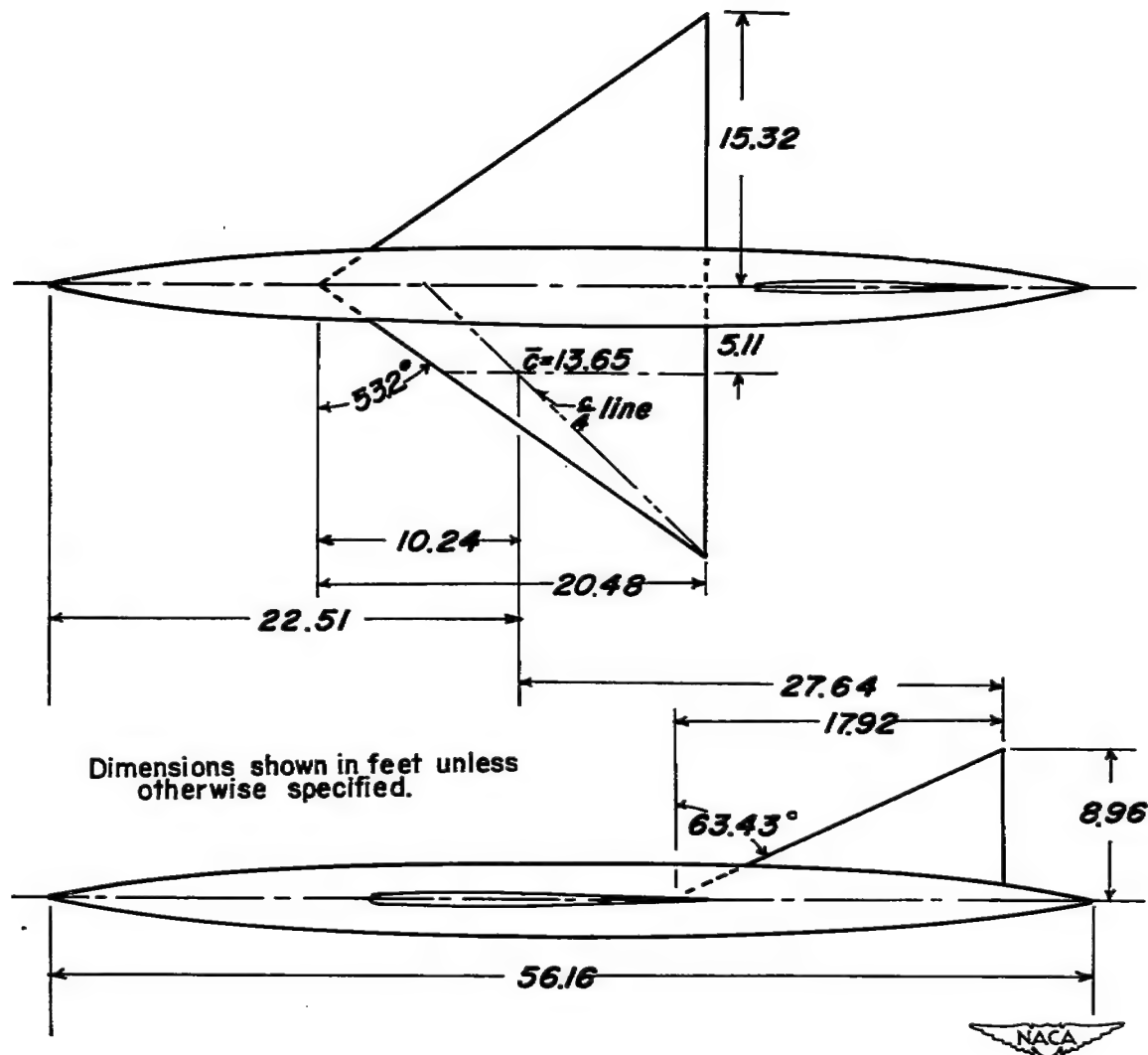


Figure 3.- Geometric details of model 3.

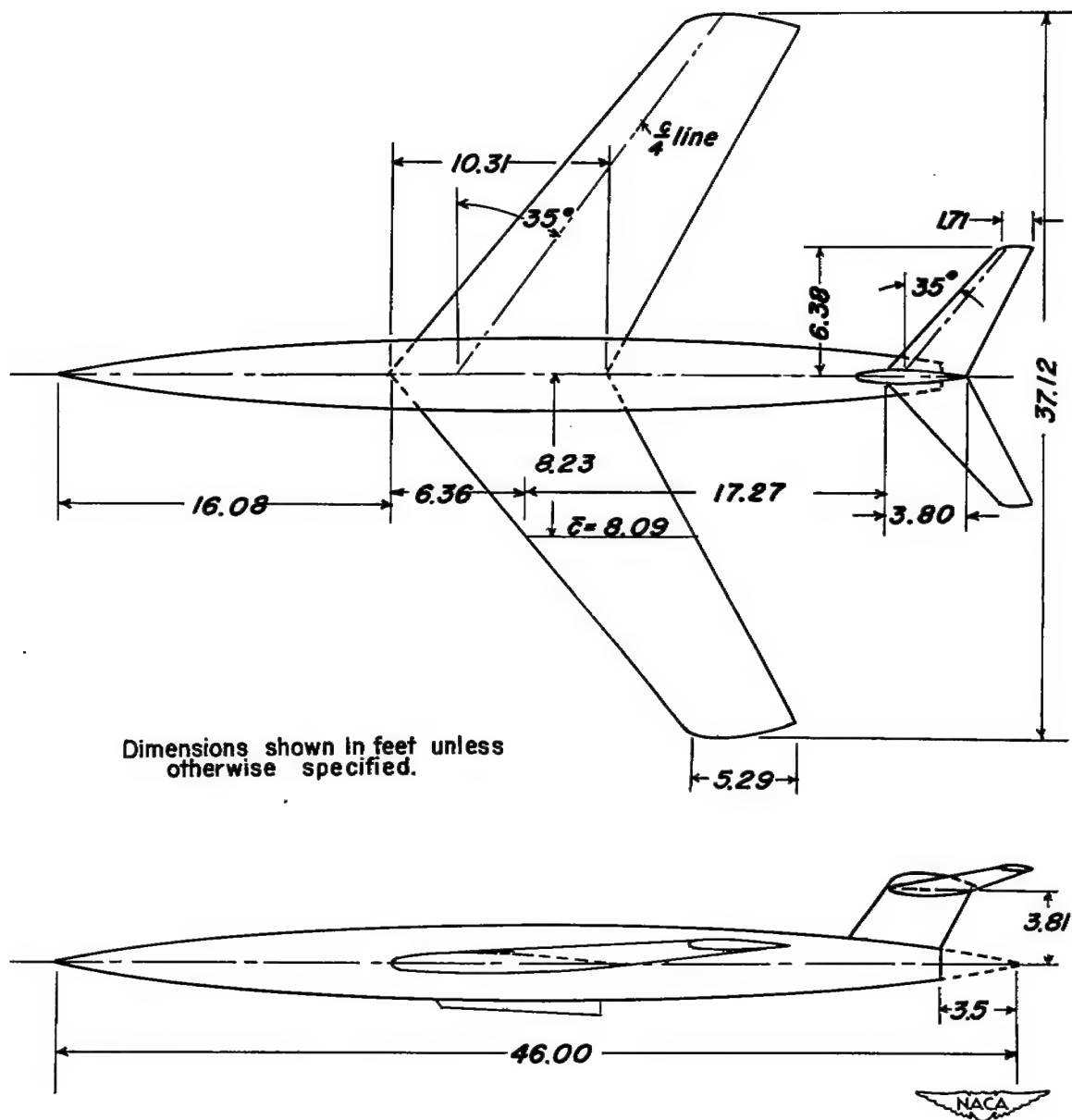
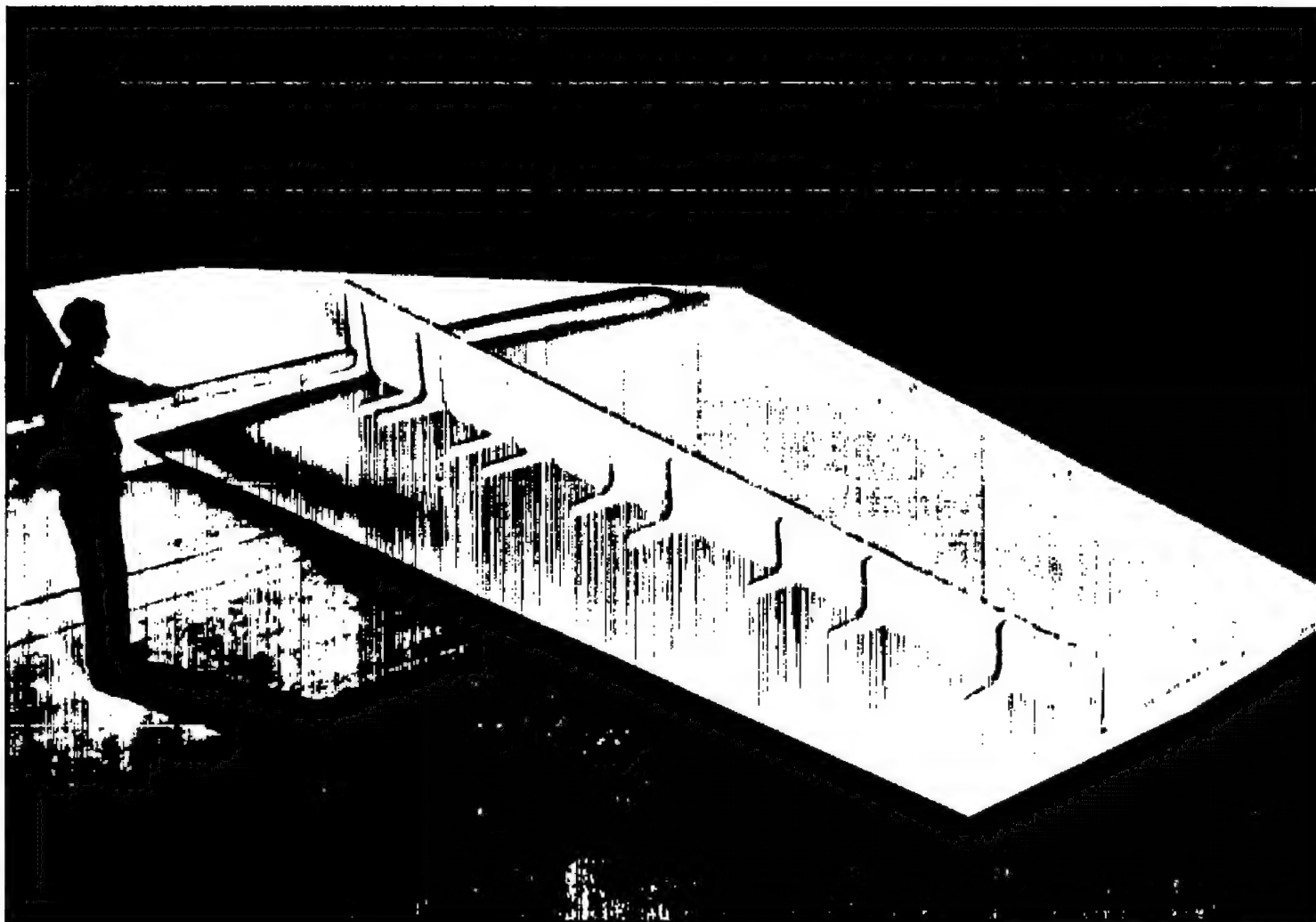


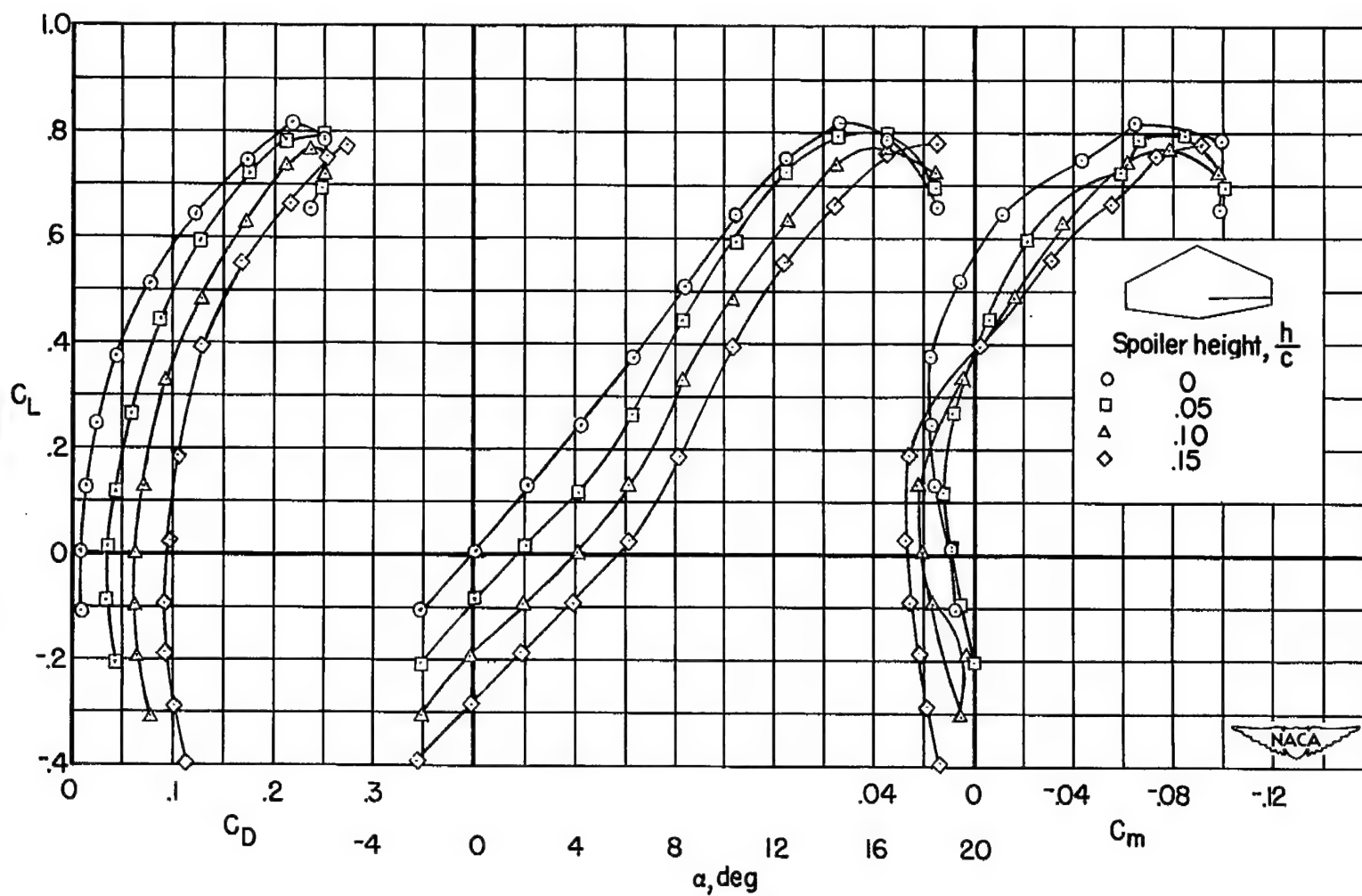
Figure 4.- Geometric details of model 4.



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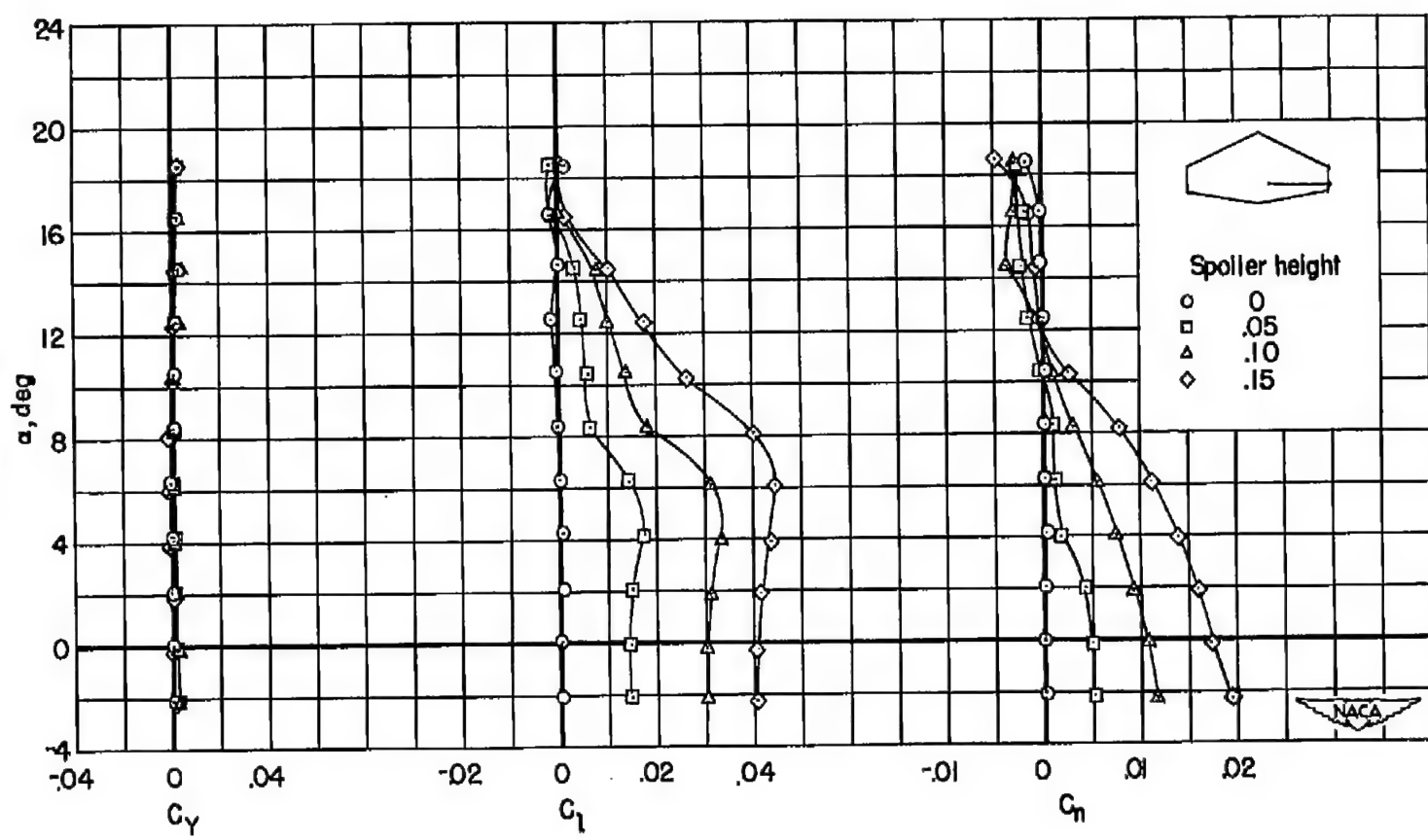
Figure 5.- Typical spoiler installation.





(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$

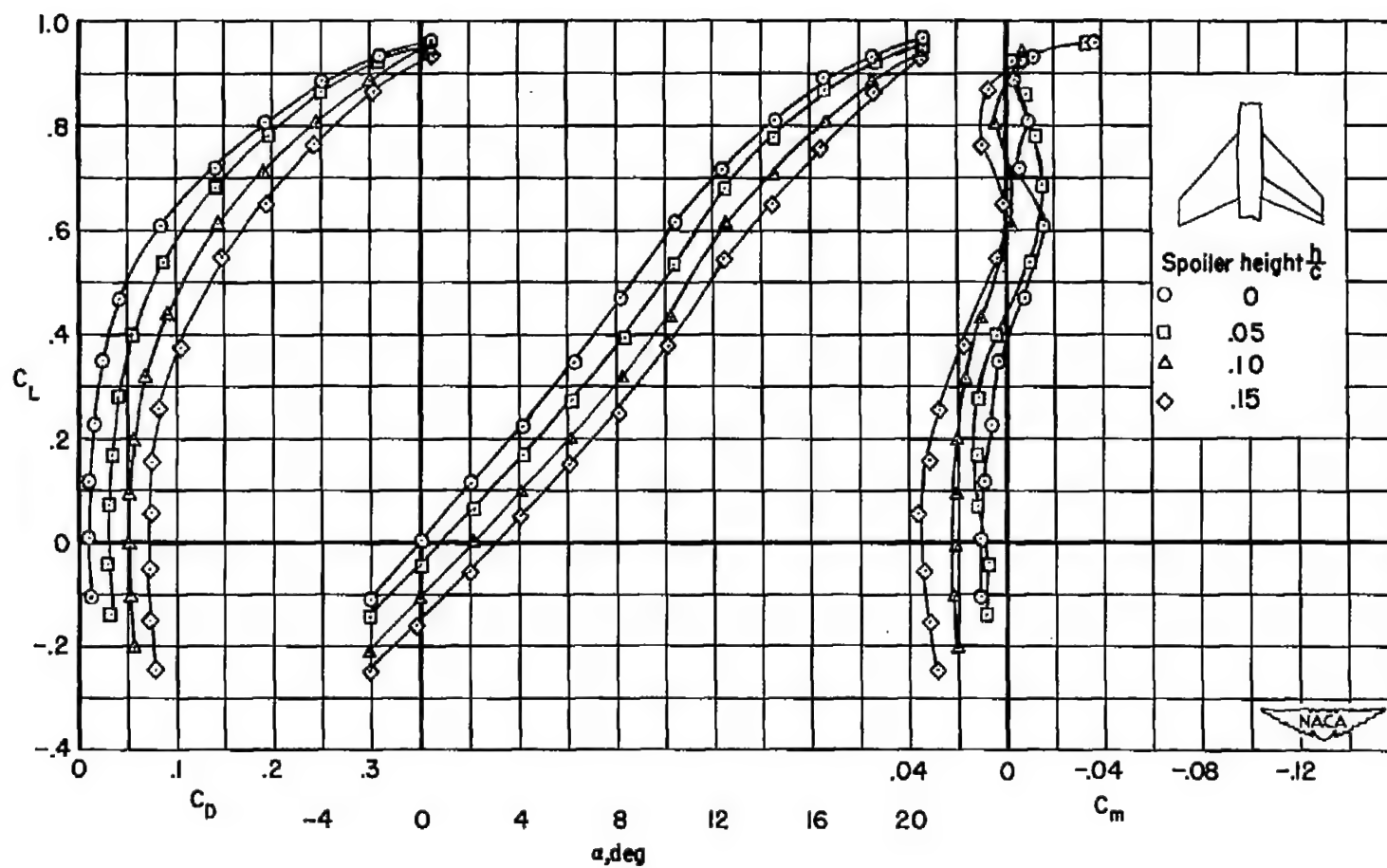
Figure 6.- Aerodynamic characteristics of model 1;  $\frac{x_g}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .



(b)  $\alpha$  vs.  $C_Y$ ,  $C_L$ ,  $C_N$

Figure 6.- Concluded.





(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$

Figure 7.- Aerodynamic characteristics of model 2 (unmodified);  $\frac{x_g}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .

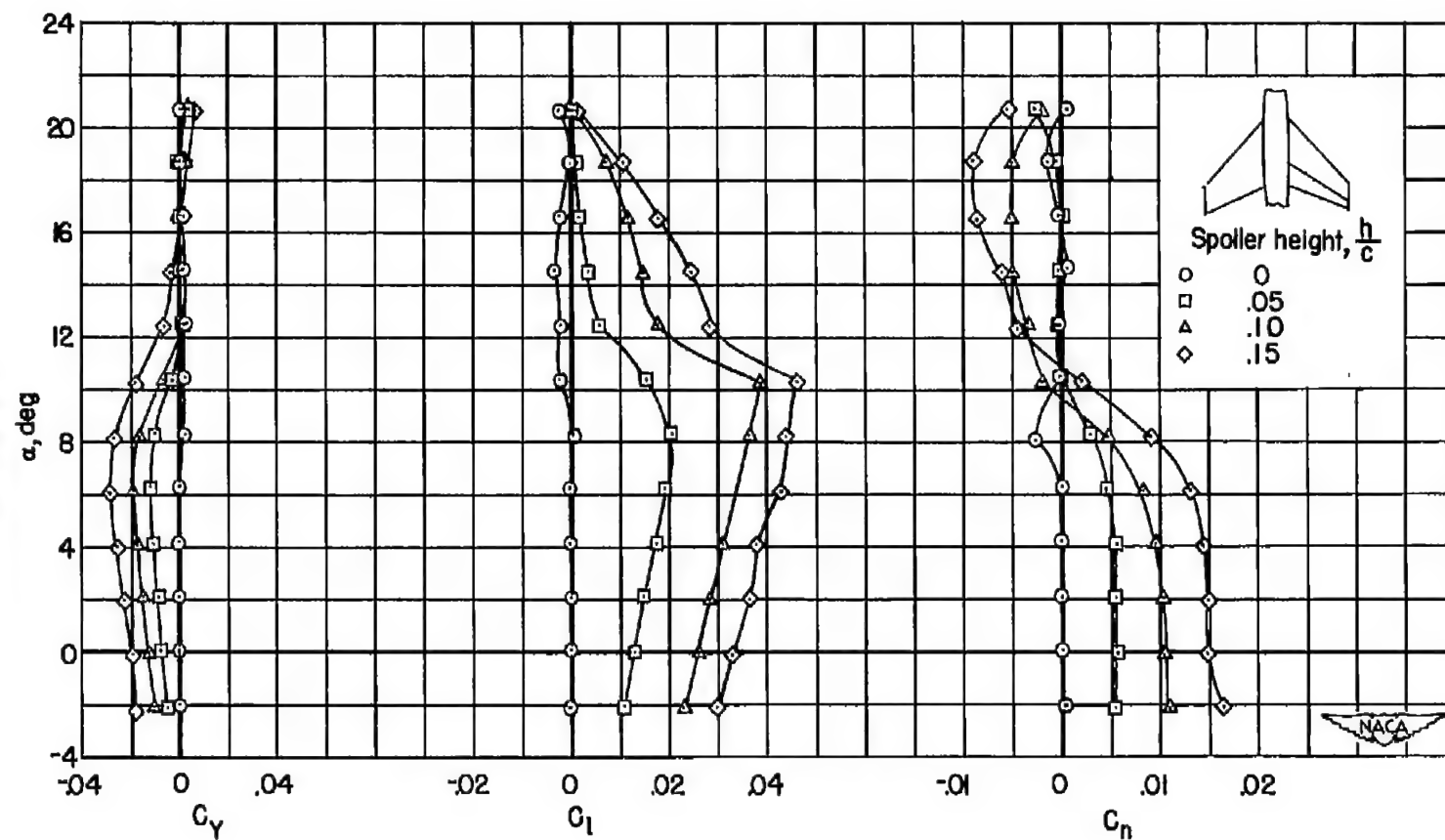
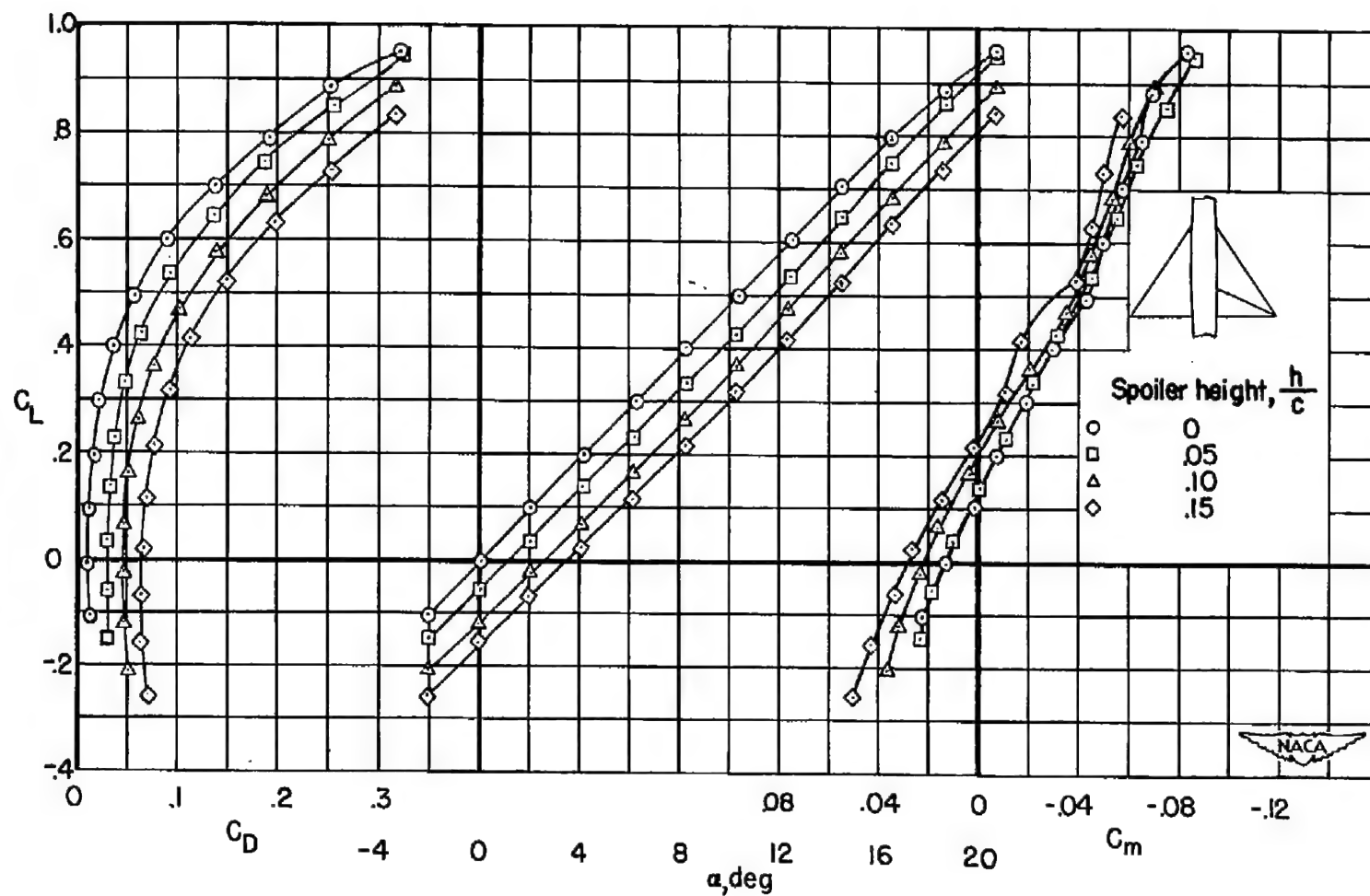
(b)  $\alpha$  vs.  $C_Y$ ,  $C_L$ ,  $C_N$ 

Figure 7.- Concluded.



(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$

Figure 8.- Aerodynamic characteristics of model 3;  $\frac{x_B}{c} = 0.70$ ;  $\eta_1 = 0.15$ ;  $\eta_0 = 1.00$ .

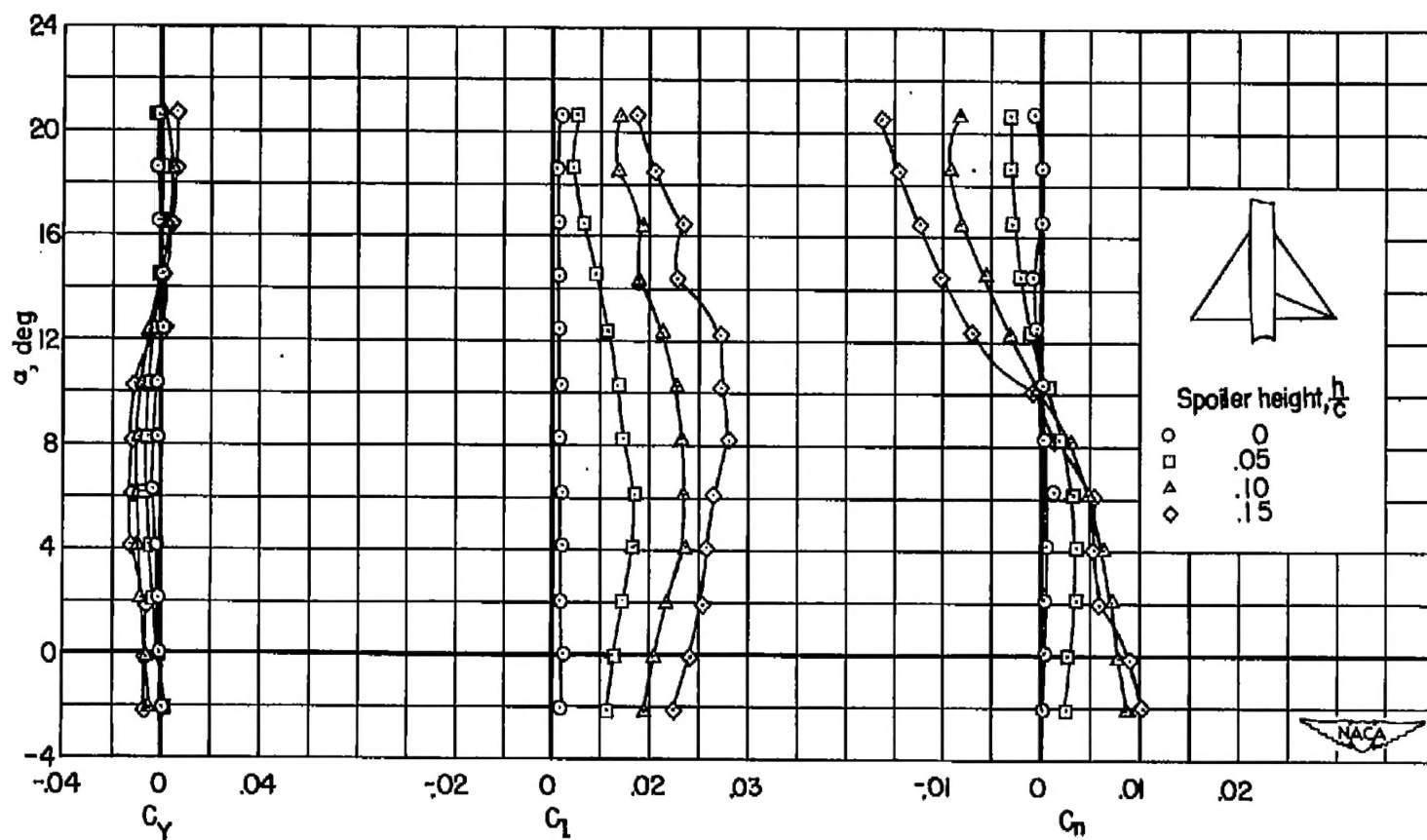
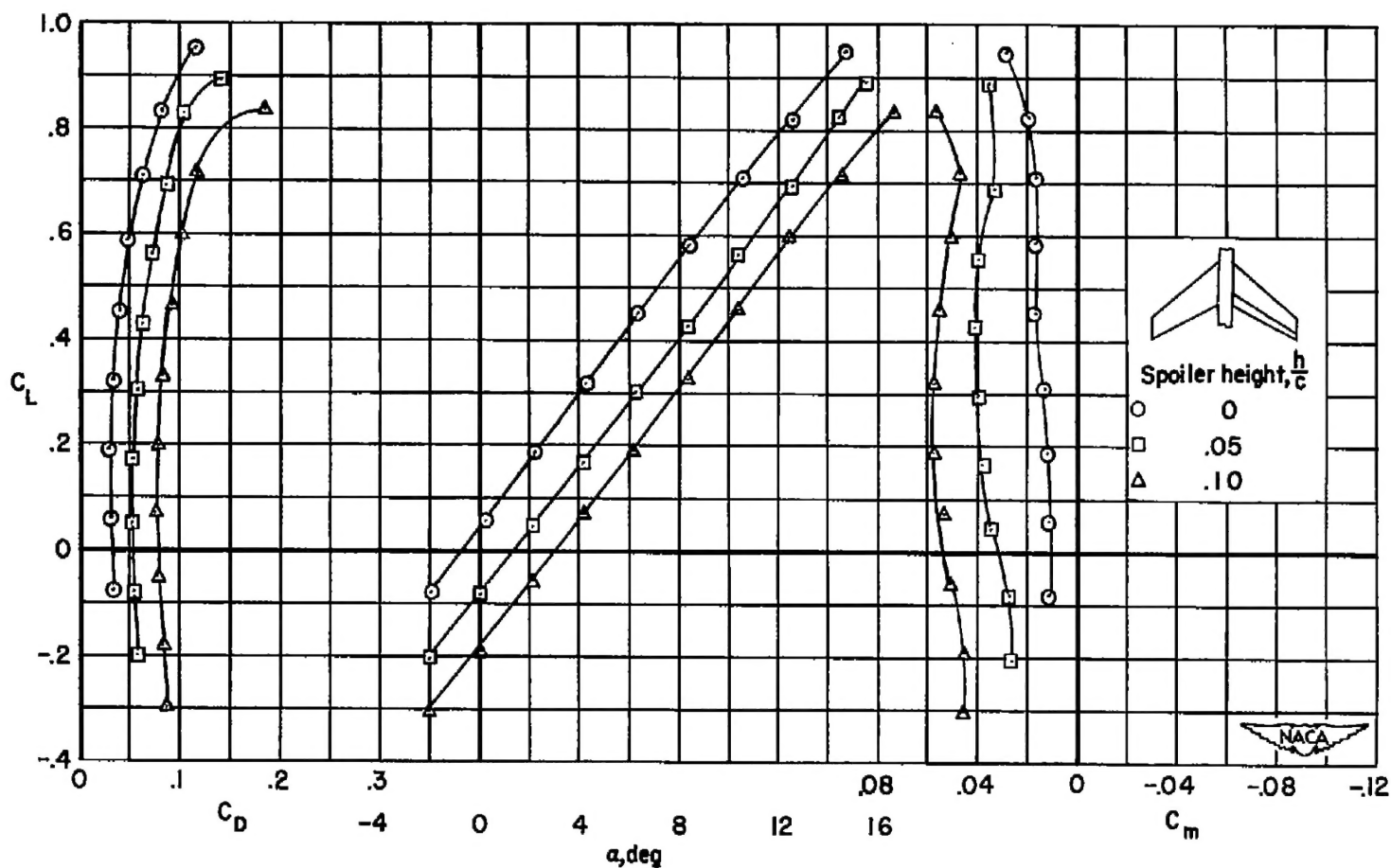
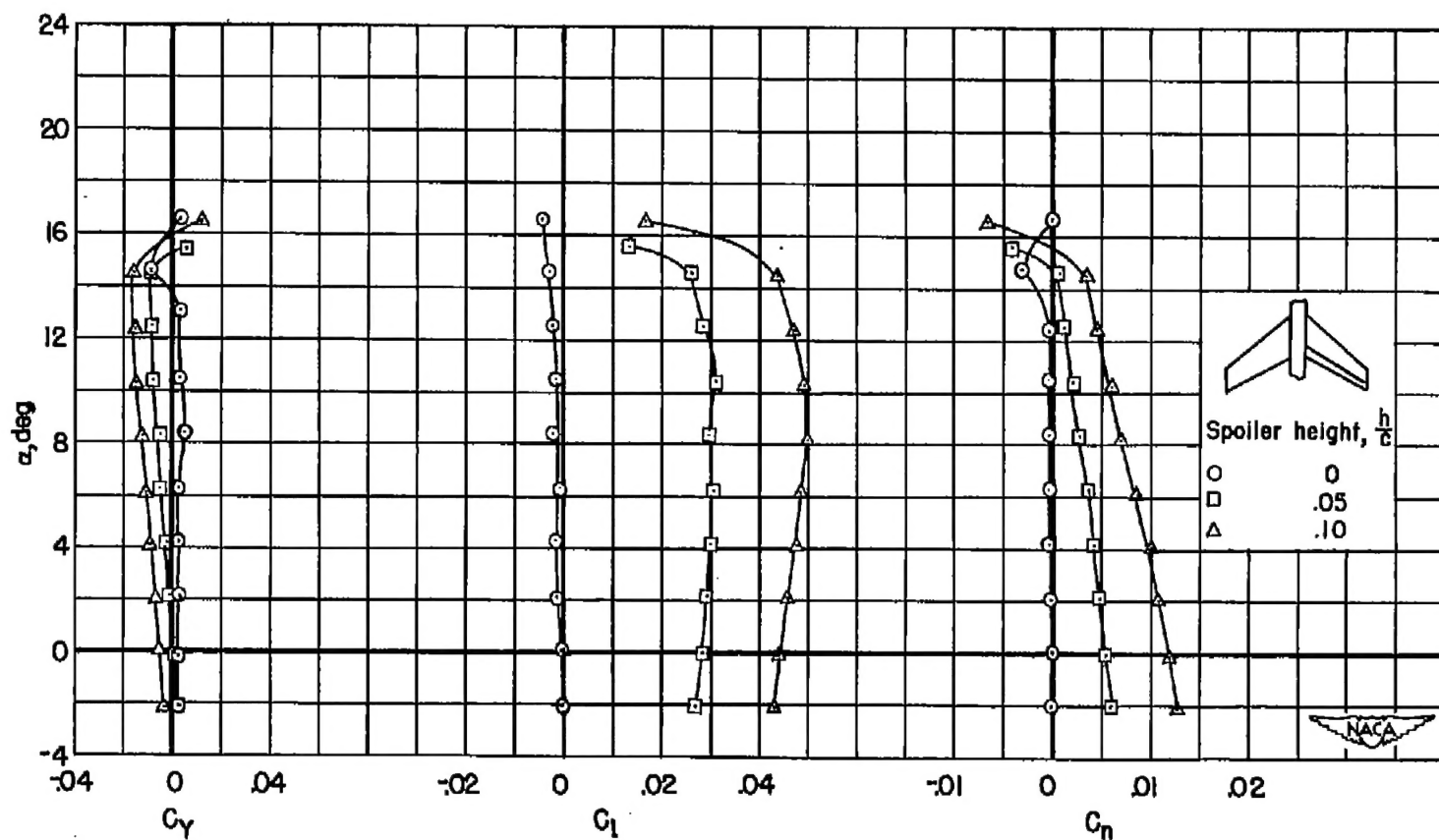
(b)  $\alpha$  vs.  $C_Y$ ,  $C_L$ ,  $C_n$ 

Figure 8.- Concluded.



(a)  $C_L$  vs.  $C_D$ ,  $\alpha$ ,  $C_m$

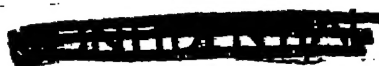
Figure 9.- Aerodynamic characteristics of model 4 with horizontal tail removed;  $\frac{x_B}{c} = 0.70$ ;  
 $\eta_1 = 0.10$ ;  $\eta_0 = 1.00$ .



(b)  $\alpha$  vs.  $C_D$ ,  $C_L$ ,  $C_N$

Figure 9.- Concluded.





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